

Service Manual

- Sec. 1** General Description
- Sec. 2** Adjustment Procedures
- Sec. 3** Block / Schematic / Circuit Board Diagrams
- Sec. 4** Exploded Views & Replacement Parts Lists
- Sec. 5** VW-AD7

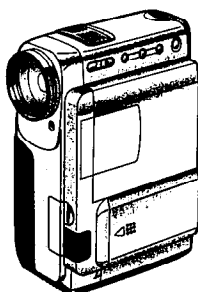
Panasonic Mini DV PAL

Digital Video Camera Recorder

AG-EZ15E

AC Adaptor

VW-AD7E



SPECIFICATIONS

ITEM	SPECIFICATION	ITEM	SPECIFICATION
POWER	Source: Battery Pack; 7.2 V DC AC Adaptor; 7.9 V DC Consumption: During Camera Recording Using The LCD; 5.1 W During Camera Recording Using The Viewfinder; 4.3 W	VIDEO	VIDEO OUTPUT LEVEL: 1.0 V _{p-p} , 75Ω (OUTPUT TERMINAL BOX, AV OUT) S-VIDEO OUTPUT LEVEL; Y: 1.0 V _{p-p} , 75Ω C: 0.3 V _{p-p} , 75Ω (OUTPUT TERMINAL BOX)
		AUDIO	RECORDING FORMAT: PCM Digital Recording; 16 bit (48 kHz/2 ch) 12 bit (32 kHz/4 ch)
RECORDING FORMAT	Digital Video SD Format		MIC IN LEVEL: -70 dBV, 5.6 kΩ (OUTPUT TERMINAL BOX) OUTPUT LEVEL: 316 mV, 600Ω (OUTPUT TERMINAL BOX, AV OUT)
TAPE FORMAT	Mini DV Cassette Tape (Tape width 6.35 mm)	DIGITAL STILL PICTURE	Digital Still Picture Output, Control Signal Input/Output (Transfer rate: max. 115 kbps)
TAPE SPEED	SP mode: 18.83 mm/s LP mode: 12.57 mm/s Record/ Playback Time SP mode: 80 min. with DVM80 LP mode: 120 min. with DVM80	DIGITAL INTERFACE	DV Output Terminal (i. LINK, 4 pin))
		MICROPHONE	Stereo
CAMERA	PICK-UP ELEMENT: CCD (Charge Coupled Device)	SPEAKER	1 round speaker ϕ 20 mm
	STANDARD ILLUMINATION: 1,400 lux	OPERATING TEMPERATURE	0-40°C
	MINIMUM REQUIRED ILLUMINATION: 1 Lux	OPERATING HUMIDITY	10-80%
	LENS: 10 : 1 Power Zoom Focal Length: 3.6-36.0 mm Macro (Full Range AF), Auto Iris, F1.8 Filter Diameter: 30.5 mm	WEIGHT	Approx. 440 g (without Battery Pack)
	IMAGE SENSOR: 1/4 inch CCD Image Sensor	DIMENSIONS	Approx. 54 (W)×118 (H)×86 (D) mm
	VIEWFINDER: 0.5 inch Colour Electronic Viewfinder 2.5 inch Colour LCD Monitor		
VIDEO	RECORDING FORMAT: Digital Component		
	TELEVISION SYSTEM: CCIR; 625 Lines, 50 Fields PAL Colour Signal		

Weight and dimensions shown are approximate.
Specifications are subject to change without notice

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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.

Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

INTRODUCTION

This Service Manual contains technical information such as General Description, Adjustment Procedures, Block Diagrams / Schematic Diagrams / C.B.A. Diagrams, Exploded Views / Parts Lists and Battery Charger VW-AD7E which service personnel to understand and service the Panasonic Digital Video Camera Recorder model AG-EZ15E.

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INTRODUCTION

Caution for AC CORD (VJA0940 type)

Information for Your Safety

IMPORTANT

Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY

■DO NOT REMOVE THE OUTER COVER.

To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.



Caution for AC Mains Lead

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt, please consult a qualified electrician.

■IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:


Blue: Neutral

Brown: Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

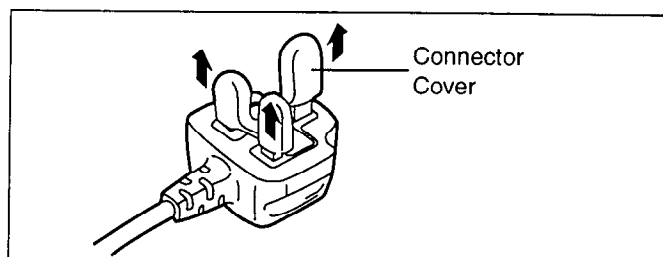
the wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol .

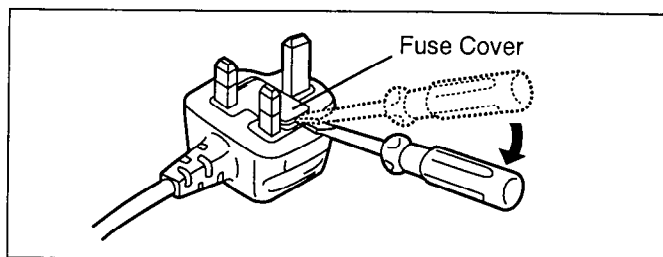
■Before use

remove the Connector Cover as follows.

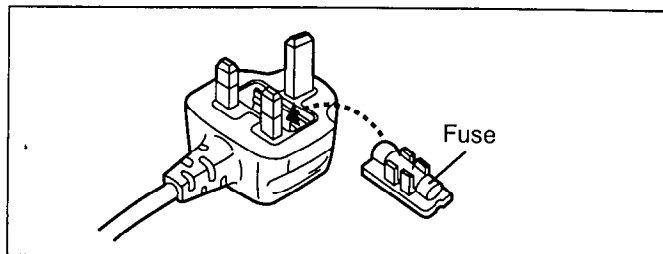


■How to replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



2. Replace the fuse and attach the Fuse cover.



ADDENDUM

VTR Main C.B.A. and Mechanical Chassis

When a parts replacement on the VTR Main C.B.A. and Mechanical Chassis is required, please replace the assembly part (VTR Main C.B.A. and/or Mechanical Chassis Unit).

Page 3

3. Preparation for Electrical Adjustment

It describes recommendation of EVR adjustment system from Video Equipment Division.

The following electrical adjustment procedures are recommended by Video system division.

3. PREPARATION FOR ELECTRICAL ADJUSTMENT

3-1. Measuring Equipment

Dual Trace Oscilloscope	Voltage Range	-----	0.001 to 50V/Div
	Frequency Range	-----	DC to 100MHz
	Probes	-----	10:1 and 1:1
DVM (Digital Volt Meter)			
Frequency Counter	Frequency Range	-----	0 to 150MHz

3-2. Adjustment System

3-2-1. With Measuring Board VFK1308P

The VFK1308P has 2 types of RS-232C connectors (9pin D-sub connector and M3 RS-232C connectors). When using with the VFK1308P in the adjustment system, an ordinary 9-pin RS-232C straight cable can be connected between the measuring board and personal computer. In this case, the RS-232C select switch on the measuring board should be selected at D-sub position.

Other type which supplied from Video Equipment Division has only M3 RS-232C connector.

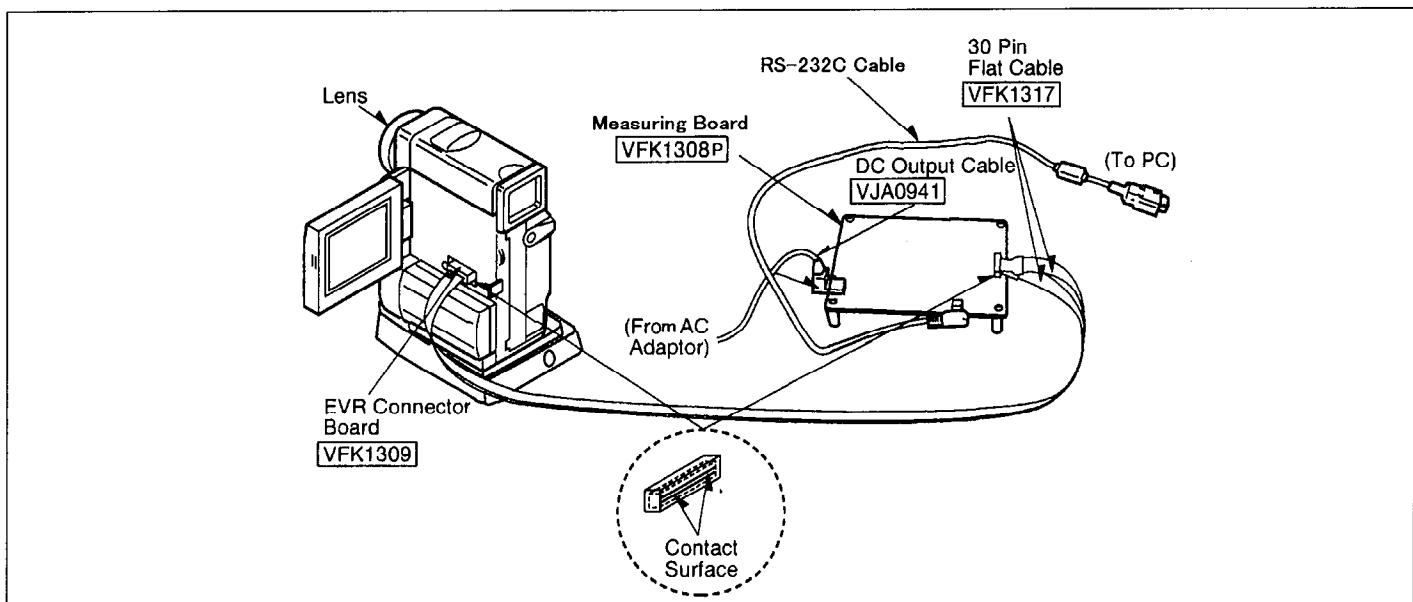


Fig. E1

3-2-2. System Hook up Procedures

1. Unscrew the screw and remove the EVR Cover as shown in Figure E2 .

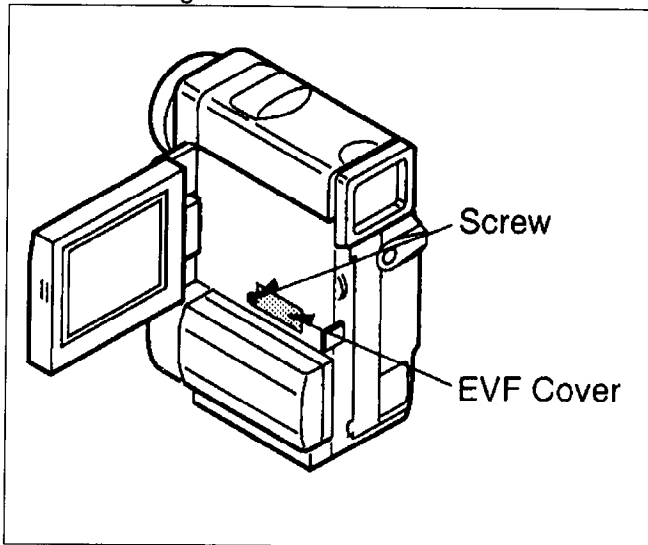


Fig. E2

2. Connect the 2 pcs of 30 pin flat cables between P101 / P102 on the Measuring Board, and 2 connectors on the Connector Board.
Make sure that the contact surface of 2 pcs. of 30 pin Flat Cables are inner side and direction of the Connection Board is as shown in Figure E3.

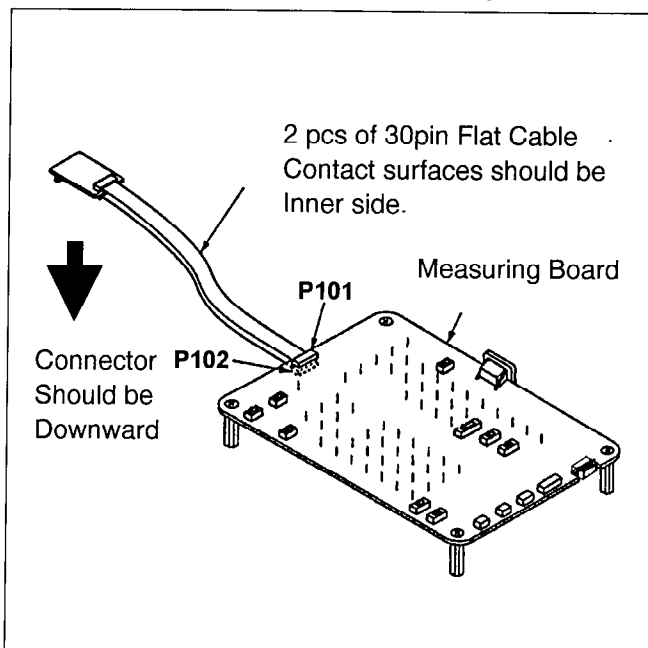


Fig. E3

3. Set the Connector Board with the 30 pin Cables to the unit as shown in Figure E6..
Make sure that the direction of the Connection Board is correctly fit as shown in Figure E4.

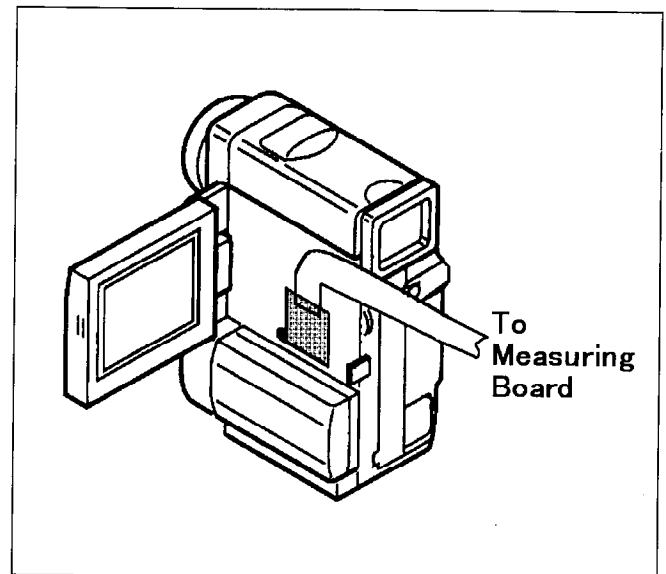


Fig. E4

4. Connect the AC adaptor or set the Battery to the unit.
5. Connect an ordinary 9 pin RS-232C cable between the Measuring Board and RS232C connector on Personal Computer as shown in Figure E1.
8. Connect the 4 pin 6V/DC Power cable between AC adaptor or DC power supply unit.

3-2-3. Lighting System

1) In the camera room using halogen lamps.

The camera adjustments should be performed under the following lighting condition.

Colour Temperature	: 3100 K°
Lamination	: 2000 Lux

2) Using "TATSUJIN" light box

If the camera room or halogen lighting system is not available, "TATSUJIN" light box can be used as shown in Figure E5.

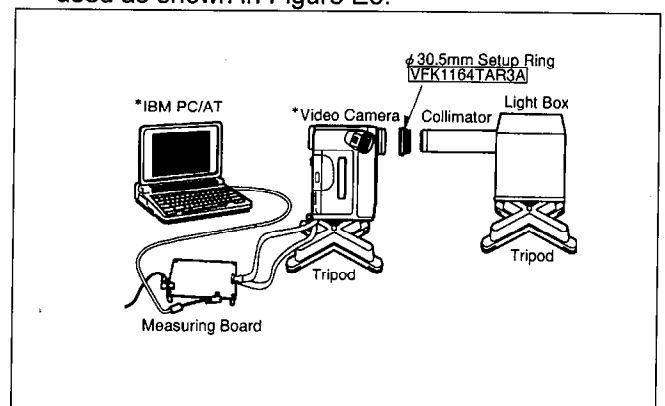


Fig. E5

3-4. Special Fixtures and Tools

In order to keep the factory adjustment specifications, the following special tools should be used to conduct mechanical, electrical adjustments and servicing.

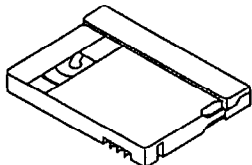
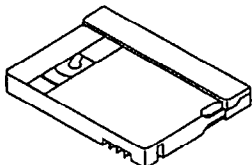
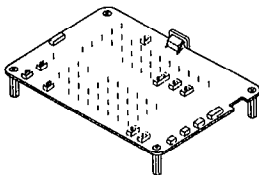
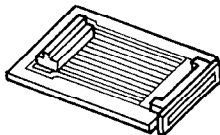
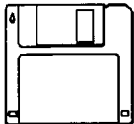
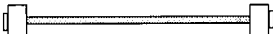

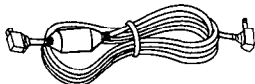

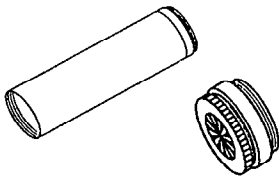




VFM3010EDS Alignment Tape (Colour Bar) 	VFK1233 Tape End/Beg. Sensor. Cassette 	VFK1308P Measuring Board 	VFK1309 EVR Connector Board 
VFK1515 EVR Adjustment Software 	----- Ordinary 9pin RS-232C Cross Cable 	VFK1317 30pin Flat Cable 	VJA0941 DC Cable 
VFK1164TAR3A 30.5mm Attachment Ring 	VFK1164TCM01 Collimator Set (with Focus Chart) 	VFK1164TFCB1 Color Chart 	VFK1164TFGS1 Gray Scale Chart 
VFK1164TFWC1 White Chart 	VFK0374 C12 Color Conversion Filter 		

Fig. E6

3-5. PC EVR (Adjustment) Software

3-5-1. Boot Up the Adjustment Software

1. Power ON the Personal Computer.
Windows 95 is set up (AUTO).
2. Restart the PC in Dos mode.
3. Insert the EVR software floppy disk (VFK1515) into the FDD drive of the PC.

	Name of Directory (Folder)	Name of Execute File
AG-EZ15E	Agez15e	ex1. exe

4. Boot up the EVR program as the following steps.

- 1) Input "a :" and then press the "ENTER" key.

```
C:\WINDOWS>a:
          ↑
        Input
```

- 2) Input "cd \" and then press the "ENTER" key.

```
A:\ * * * * >cd \
          ↑
        Input
```

- 3) Input "cd agez15e" and press the "ENTER" key.

```
A: \>cd agez15e
          ↑
        Input
```

- 4) input "ex1" and then press the "ENTER" key.

```
AG-EZ10
A: \AGEZ15E>ex1
          ↑
        Input
```

- 5) Wait for a few seconds so that the EVR adjustment program is started.
- 6) For the adjustments, follow the program display.

3-5-2. How to Use the Main Menu

Select a Sub Menu to check, adjust the unit and etc. by pressing ↑ ↓ (UP/DOWN) Key in Main Menu. Then, press "ENTER" Key. The Sub Menu will be displayed.

Note: Menu (pages) 3 through 6 are needed for adjustment.

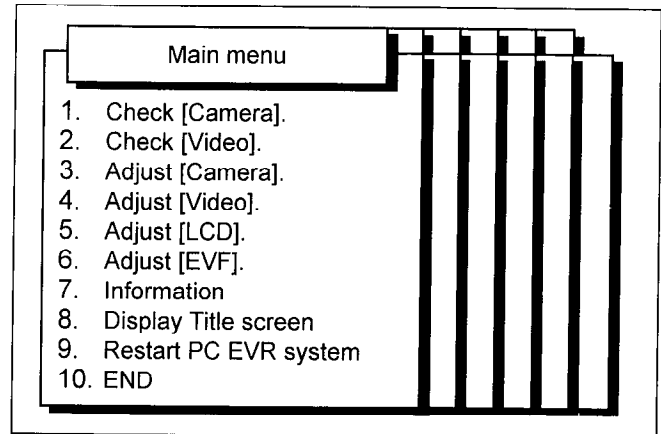


Fig. E7

With using ← → keys, also the menu can be changed.

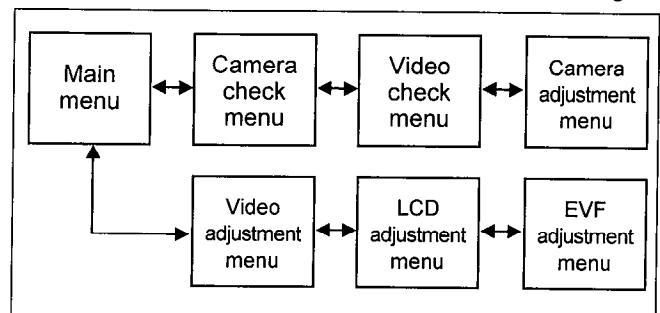


Fig. E8

3-5-3. Introduction of the Sub Menu

1) Camera Check Menu

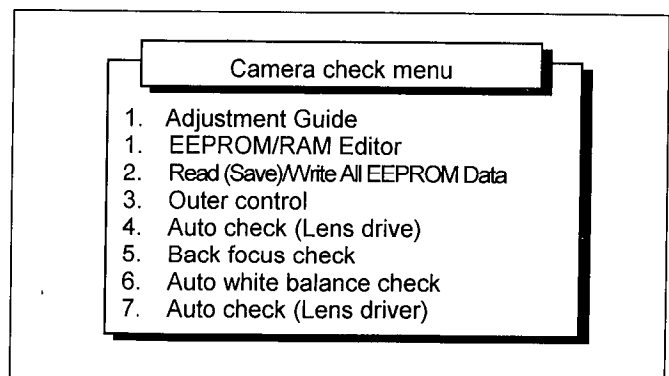


Fig. E9

2) Video Check Menu

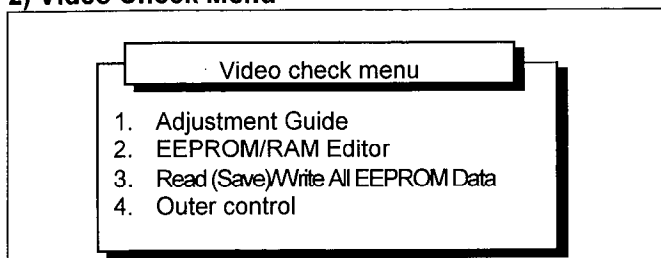


Fig. E10

3) Camera Adjustment Menu

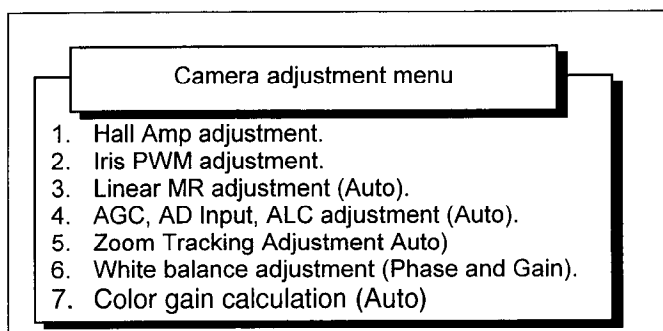


Fig.E11

4) Video Adjustment Menu

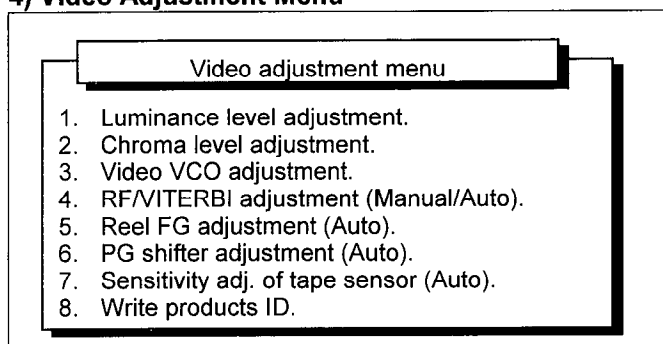


Fig. E12

5) LCD Adjustment Menu

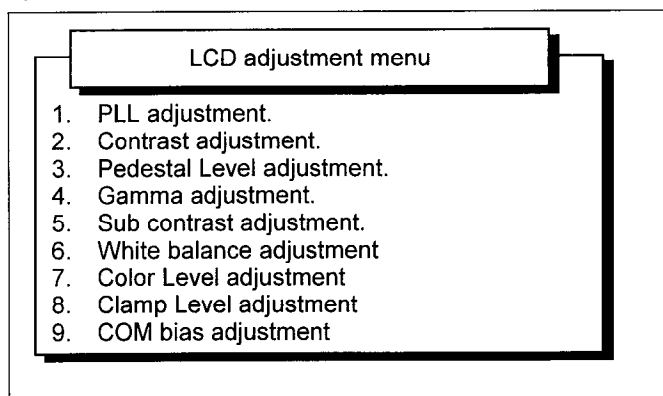


Fig. E13

6) EVF Adjustment Menu

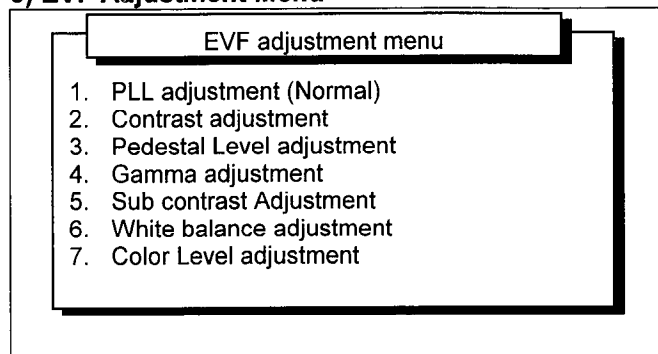


Fig. E14

3-5-4. Restoration of Connecting Error

This program checks connecting condition with the movie all the time.

When the movie power is off, or VTR is reset, or cable is disconnected during servicing, restart the program by pressing "CTRL" key and "BREAK" key together.

3-5-5. Waveform Illustration

This program displays the waveform illustration, when "F2" key is pressed in the adjustment mode.

Be sure to save both the EEPROM data into the personal computer before performing service and adjustment, in order to avoid any accidental data loss.

3-5-6. How to Save Camera EEPROM Data

- 1) Select "1. Check [Camera]." In the Main menu, and then press the "Enter" key.
- 2) Select "3. Read [Save]/Write All EEPROM data" in the Camera check menu, and then press the "Enter" key.
- 3) Select "5. Save all data of EEPROM" in Read [Save]/Write All EEPROM data menu, and then press the "Enter" Key.
- 4) Input the File name and, then press the "Enter" key. The data of EEPROM can be stored in the personal computer.

3-5-7. How to Save VTR EEPROM Data

- 1) Select "2. Check [Video]." In the Main menu, and then press the "Enter" key.
- 2) Select "3. Read [Save]/Write All EEPROM data" in the Video check menu, and then press the "Enter" key.
- 3) Select "2. Save all EEPROM data" in Read [Save]/Write All EEPROM data menu, and then press the "Enter" key.
- 4) Input the File name, and then press "Enter" key.
The data of EEPROM will be stored in the personal computer.

3-5-8. How to REWRITE Saved data

When it becomes impossible to adjust during service and adjustment, rewrite the saved data which stored in paragraphs 3-5-6., 3-5-7. to the EEPROM as follows. And readjust.

3-5-9. How Rewrite Camera Saved Data

- 1) Select "1. Check [Camera]." In the Main menu, and then press the "Enter" key.
- 2) Select "3. Read [Save]/Write All EEPROM data" in the Camera check menu, and then press the "Enter" key.
- 3) Select "6. Data write using stored file" in Read [Save]/Write All EEPROM data menu, and then press the "Enter" key.
- 4) Input the saved file name, and then press the "Enter" key.
- 5) The data can be written in the EEPROM.

3-5-10. How Rewrite Video C.B.A. Saved Data

- 1) Select "2. Check [Video]." In the Main menu, and then press the "Enter" key.
- 2) Select "3. Read [Save]/Write All EEPROM data" in the Video check menu, and then press the "Enter" key.
- 3) Select "3. Writing from the stored data files" in the Read [Save]/Write All EEPROM data menu, and then press "Enter" key.
- 4) Input the saved file name, and then press the "Enter" key.
- 5) The data will be written in the EEPROM .

3-6. VTR Main C.B.A. REPLACEMENT

3-6-1. Camera Data

In case that the VTR Main C.B.A. is replaced, be sure to write the data to Camera EEPROM on the VTR main C.B.A. as follows.

1. Select "1. Check [Camera]." In the Main menu, and then press the "Enter" key.
2. Select "3. Read [Save]/Write All EEPROM data" in the Camera check menu, and then press the "Enter" key.
3. Select "6. Data write using stored file" in the Read [Save]/Write All EEPROM data menu, and then press the "Enter" key. Input the saved file name, and then press the "Enter" key.
OR;
Select "7. Data write with Average data," and then press the "Enter" key. And press the "Enter" key once again.

3-6-2. VTR Data.

In case that the VTR Main C.B.A. is replaced, be sure to write the data to the EEPROM on the VTR Main C.B.A. as follows.

1. Select "2. Check [Video]." In the Main menu, and then press the "Enter" key.
2. Select "3. Read [Save]/Write All EEPROM data" in the Video check menu, and then press the "Enter" key.
3. Select "3. Writing from stored data files." In Read [Save]/Write All EEPROM data menu, and then press the "Enter" key. Input the saved file name, and then press the "Enter" key.
OR;
Select "4. Writing of fixed/average values," and then press the "Enter" key. And press the "Enter" key once again. Then, input ID Number as follows.

3-6-3. How to input ID Number

When writing the data to the EEPROM after replacing VTR Main C.B.A.;

When selecting "4. Writing of fixed/average values," ID Number needs to be input.

When selecting "3. Writing from stored data files," ID Number stored data file will be written automatically.

When writing ID Number from the saved data which is stored in 3-5-7.

1. Select "2. Check [Video]." In the Main menu, and then press the "Enter" key.
2. Select "3. Read [Save]/Write All EEPROM data" in the Video check menu, and then press the "Enter" key.
3. Select "5. Writing ID from the stored file." In Read [Save]/Write All EEPROM data menu, and then press the "Enter" key. Input the saved file name, and then press the "Enter" key.
The ID Number will be automatically written.

When the original ID information can not be read because of the destruction of EEPROM etc.:

1. Select "4. Adjust [Video]." In Main menu, and then press "Enter" key.
2. Select "9. Write products ID" in the Video adjustment menu, and then press the "Enter" key.
3. ID Number will be written automatically.

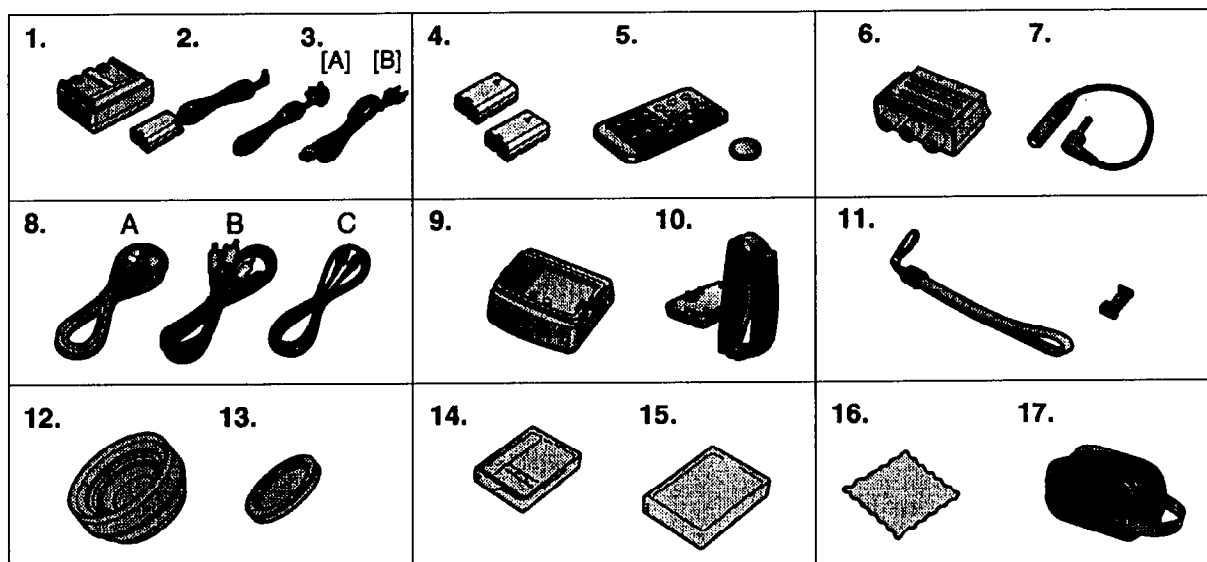
Note: The adjusted data has been written to the EEPROM after each adjustments.

Page 1-1.

Standard Accessories

It shows the standard accessories of NV-EX1(PAL)

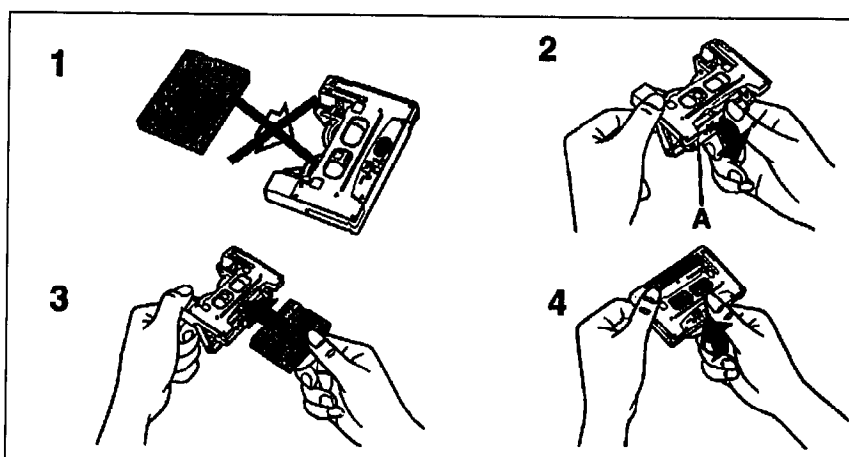
The following list shows the accessories of AG-EZ15.



Standard Accessories

- | | | |
|---|---|---|
| <p>1. AC Adaptor (→ 16, 18, 140)
To supply power to the Movie Camera.
To charge the Battery.</p> <p>2. DC Input Cable (→ 16)
To connect the AC Adaptor to the Movie Camera.</p> <p>3. AC Mains Cables (→ 16, 18)
To connect the AC Adaptor to an AC mains socket.
[A] England and Hong Kong only
[B] Areas other England and Hong Kong</p> <p>4. Battery Pack (→ 18)
To supply the Movie Camera with power.</p> <p>5. Remote Controller and Button-Type Battery (→ 100, 106)</p> | <p>6. 21-pin Adaptor (→ 54, 114, 116, 118)</p> <p>7. Headphone Conversion Adaptor (→ 156)</p> <p>8. A. AV Cable (PHONO - M3)
(→ 54, 114)
B. AV Cable (PHONO - PHONO)
(→ 54, 114, 116, 118)
C. S-Video-Cable
(→ 54, 114, 116, 118, 120, 122)</p> <p>9. Output Terminal Box [AV ONE TOUCH STATION] (→ 54, 56, 112)
Equipped with AV Sockets, Edit Socket and Microphone Socket.</p> | <p>10. Hand Grip (→ 28)</p> <p>11. Hand Strap (→ 30)
Lens Cap Holder for Hand Strap (→ 30)</p> <p>12. Wide Conversion Lens (→ 190)</p> <p>13. ND Filter (→ 190)</p> <p>14. Mini DV Cassette (→ 22)</p> <p>15. Cassette Adaptor (→ 128)</p> <p>16. Cleaning Tissue
To clean the Lens and the LCD Monitor.</p> <p>17. Soft Bag (→ 56)
To store the Movie Camera when it is not being used or when you carry it.</p> |
|---|---|---|

The following shows the operating instruction of Cassette Adaptor for DVCPRO.



Cassette Adaptor

It can only be used with S cassettes bearing the DV mark.
It can only be used to play back DV cassettes which are recorded in format.

- 1 Take care to insert the cassette in the proper direction.
- 2 Open the Cassette Adaptor.
- 3 Insert the Cassette tape.
- 4 Close the Cassette Adaptor.

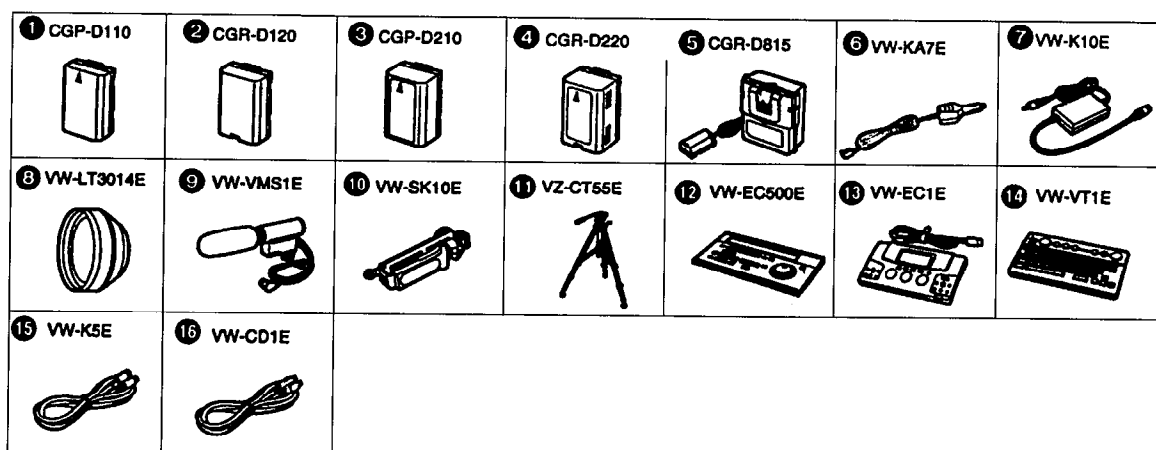
•Do not subject the cassette adaptor to strong shocks or vibration as it uses precision parts. Also, do not modify or disassemble the cassette adaptor. After use, remove the DV cassette and store it in its case.
•Do not push down A (rear door) using an unnecessarily large force.

Page 1-30.

Optional Accessories

It shows the optional accessories of NV-EX1(PAL)

The following list shows the optional accessories of AG-EZ15.



Optional Accessories

- | | | | |
|--------------------------|--------------------------|--------------------------|----------------------|
| ① Battery Pack (Lithium) | ⑤ Battery Pack (Lithium) | ⑨ Stereo Zoom Microphone | ⑬ Editing Controller |
| ② Battery Pack (Lithium) | ⑥ Car Adaptor Cord | ⑩ Shoe Adaptor | ⑭ Video Titrer |
| ③ Battery Pack (Lithium) | ⑦ 5-Pin Synchro Cord | ⑪ Tripod | ⑮ Edit Cable |
| ④ Battery Pack (Lithium) | ⑧ Tele Conversion Lens | ⑫ Editing Controller | ⑯ DV Cable |

•Some accessories are not available in some countries.

Memo

Service Information

1. Service Extension Cables

Use the following extension cables when checking or adjusting individual circuit boards.

No.	Part No.	Pin	Part Name	Connection	Q'ty	Remarks
①	VFK1458	70	Flat Cable	PS2001 (VTR Main)-PP2001 (Drive)	1	
②	VFK1284	24	Flat Cable	FP3201 (VTR Main)-Head Amp	1	
③	VFK1442	21	Flat Cable	FP601 (VTR Main)-FP903 (Monitor)	1	
④	VFK1442	21	Flat Cable	FP602 (VTR Main)-FP904 (Monitor)	1	
⑤	VFK1442	21	Flat Cable	FP701 (VTR Main)-Lens Flex.	1	
⑥	VFK1459	39	Flat Cable	FP4201 (VTR Main)-FP4001 (Mic Unit)	1	
⑦	VFK1460	20	Flat Cable	PS201 (VTR Main)-PP291 (CCD)	1	
⑧	VFK1461	20	Flat Cable	FP801 (VTR Main)-E.V.F. (A)	1	
⑨	VFK1462	70	Flat Cable	PS301 (VTR Main)-PP3401 (Operation I/F)	1	
⑩	VFK1463	90	Flat Cable	PP1001 (VTR Main)-PS1001 (Power)	1	
⑪	VFK1464	7	Flat Cable	FP3301 (VTR Main)-AV Jack	1	
⑫	VFK1441	8	Flat Cable	FP2204 (VTR Main)-Mecha. Flex.	1	
⑬	VFK1465	5	Flat Cable	FP6303 (VTR Main)-Cassette Down Flex.	1	
⑭	VFK1443	18	Flat Cable	FP2203 (Drive)-Mecha. Flex.	1	
⑮	VFK0977	20	Flat Cable	FP6001 (VTR Main)-Rear Operation U.	1	
⑯	VFK1440	10	Flat Cable	FP6302 (Operation I/F)-VTR Operation U.	1	
⑰	VFK1364	14	Flat Cable	FP1001 (Power)-Battery Catcher	1	
⑱	VFK1480	6	Flat Cable	FP6702 (Operation I/F)-Zoom Operation U.	1	
⑲	VFK1443	18	Flat Cable	FP2201 (Drive)-Mecha. Cap.	1	
⑳	VFK1440	10	Flat Cable	FP2202 (Drive)-Mecha. Cyl.	1	

2. Service Position

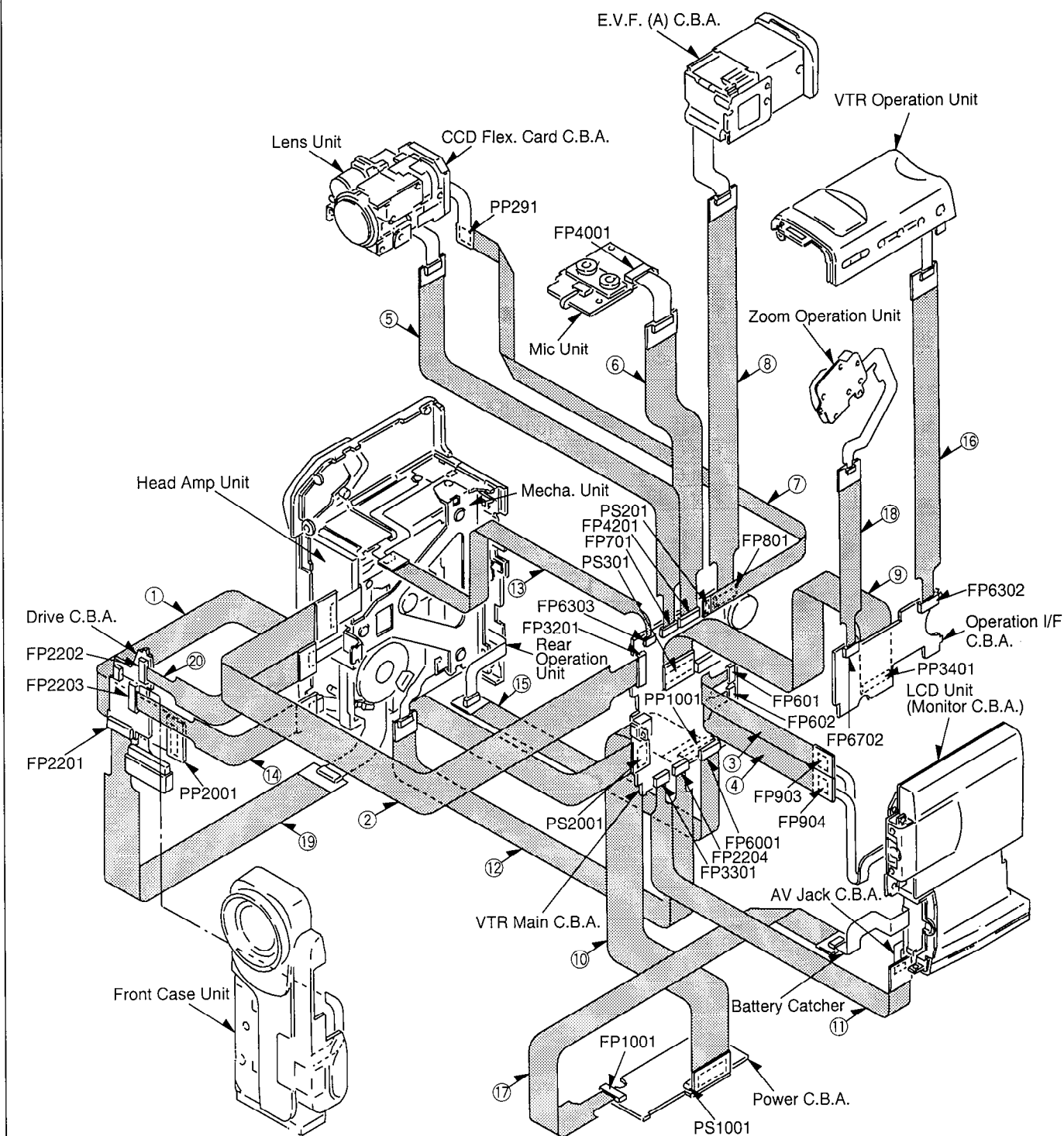


Fig. T1

3. Preparation for Electrical Adjustment

Remove Screw and EVR Cover which is located on the Side Case Unit as follows.

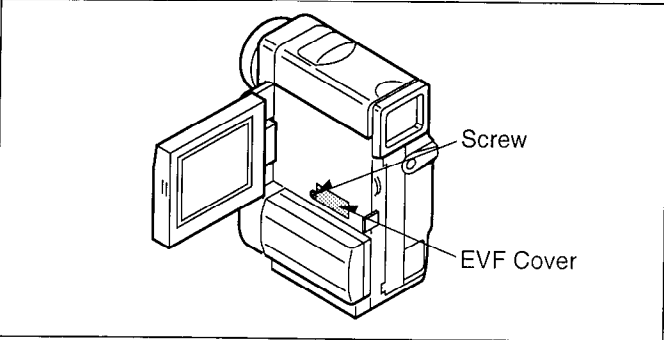


Fig. E1

Then connect the following cables as shown in Fig. E2.

Part No.	Part Name	Q'ty	Remarks
VFK1395	232C (M3) I/F Cable	1	
VFK1308E	Measuring Board	1	
VFK1309	EVR Connector Board	1	
VFK1317	30 Pin Flat Cable	2	
VJA0941	DC Output Cable	1	For AC Adaptor
VFK1164TAR3A	Setup Ring (ϕ 30.5 mm)	1	For Collimator

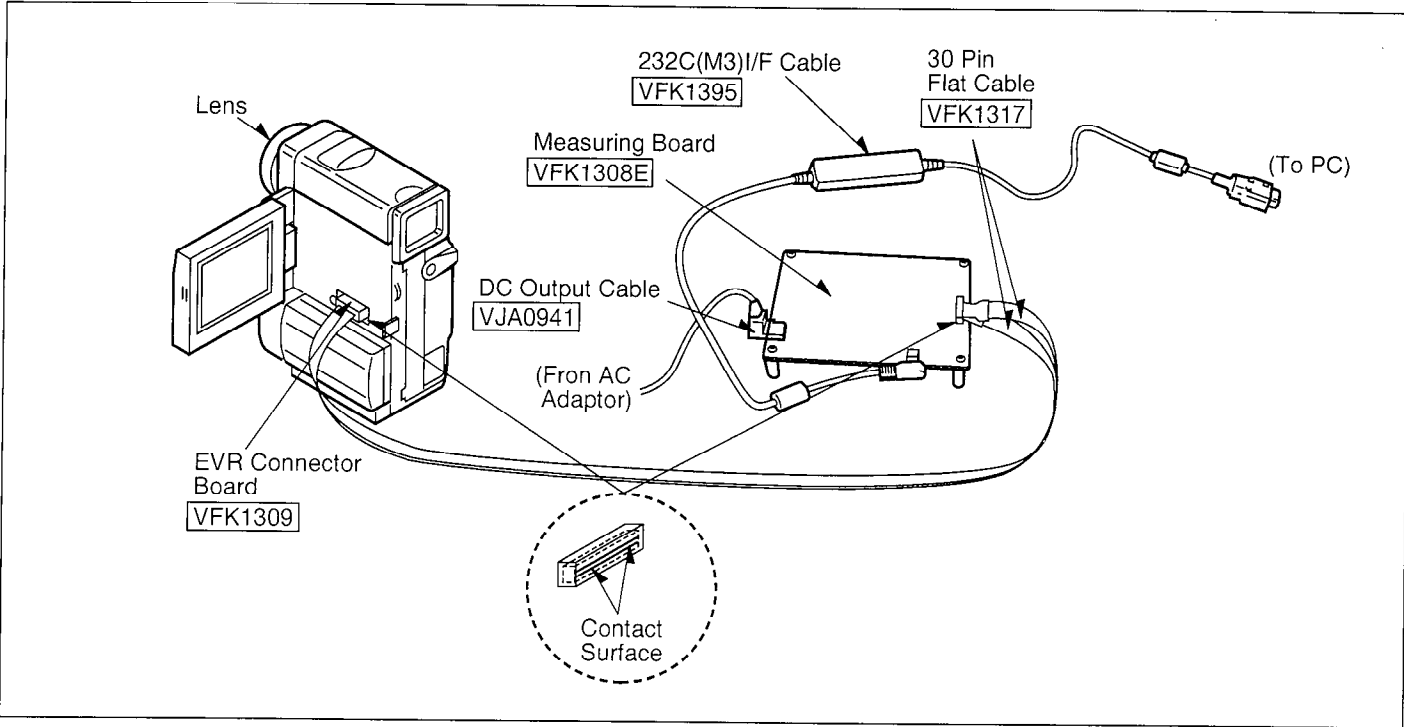


Fig. E2

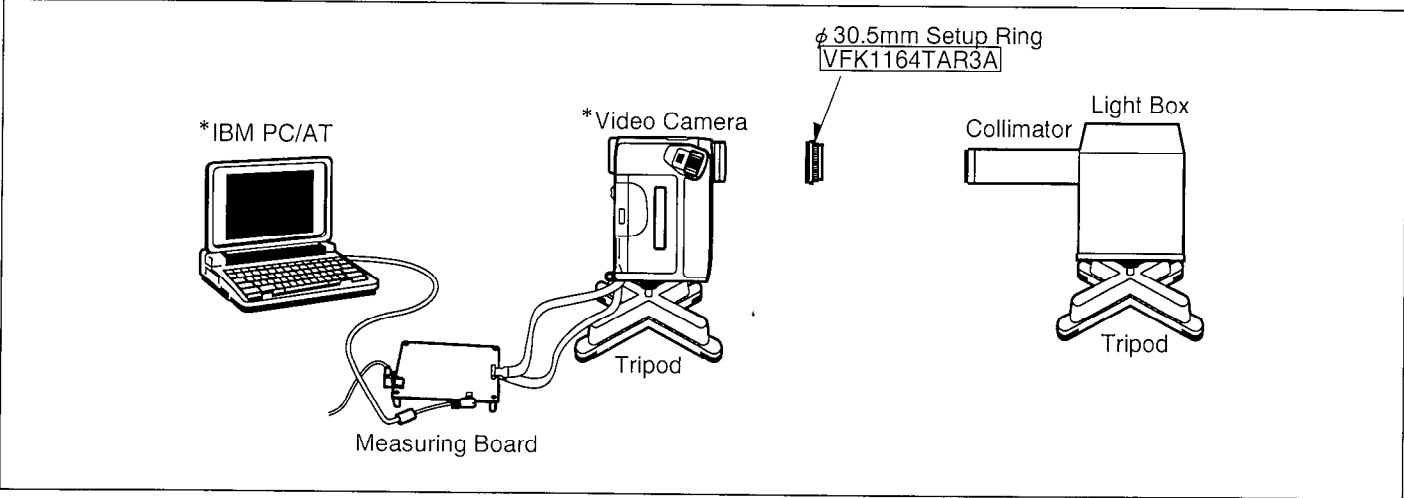
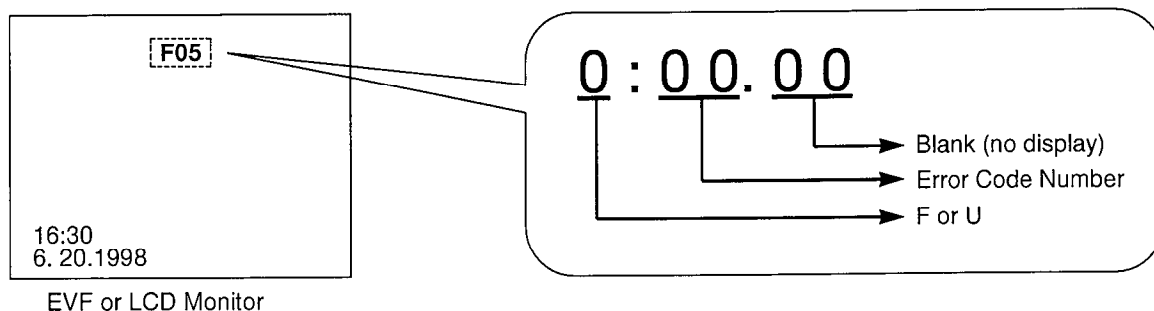


Fig. E3

4. Service Mode

When undesirable conditions occurred, the error code is displayed on the EVF or LCD Monitor.
Also, the Camera LED is flashed according to the error code as follows.



DISPLAY	CONDITION	POWER OFF TIMING / POWER LED FLASHING TIMING
F01	T-Reel Lock	After 1 minute flashing the LED
F02	S-Reel Lock	After 1 minute flashing the LED
F03	Unloading Lock	After 1 minute flashing the LED
F04	Loading Lock	After 1 minute flashing the LED
F05	Cylinder Lock	After 1 minute flashing the LED
F31	Data Transmission Error	Not turning OFF
F51	Focus Motor Lock	Not turning OFF Power LED is flashed at 1 Hz timing
F52	Zoom Motor Lock	Not turning OFF Power LED is flashed at 1 Hz timing
U10	Dew Detection	After 18 seconds flashing the LED Power LED is flashed at 1 Hz timing
U11	Head Clogging	Not turning OFF

5. How to replace the Lithium Battery (Procedure)

1. Remove the 7 Screws. (See Fig. B1)
2. Open the Rear Operation Unit.
3. Unsolder the Lithium Battery "VL1220/1FC" and then replace the new one. (See Fig. B1)

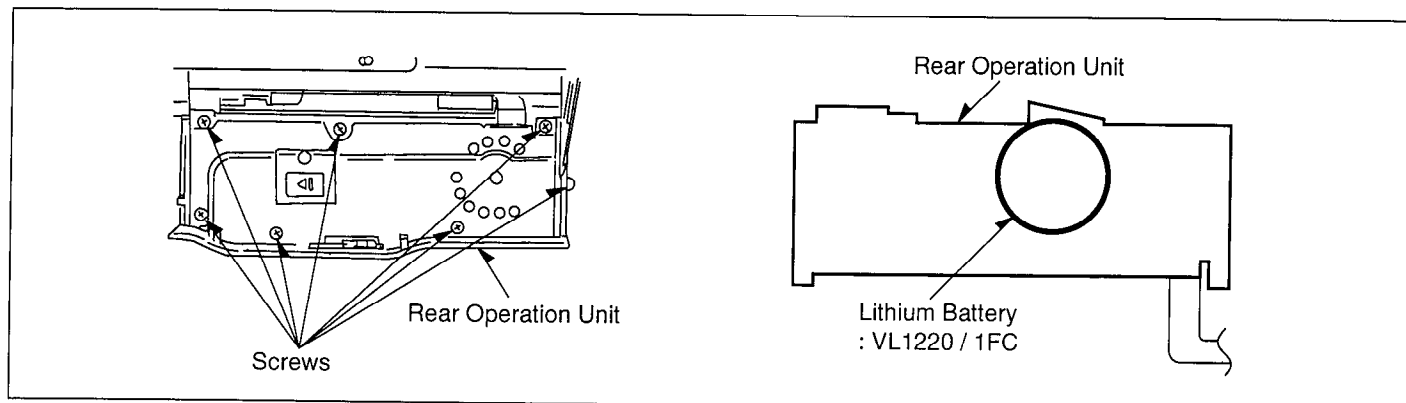


Fig. B1

NOTE:

The lithium battery is a critical component (Type No.: VL1220/1FC Manufactured by Panasonic.)

It must never be subjected to excessive heat or discharge.

It must therefore only be fitted in equipment designed specifically for its use.

Replacement batteries must be of the same type and manufacture.

They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.

Do not attempt to re-charge the old battery or re-use it for any other purpose.

It should be disposed of in waste products destined for burial rather than incineration.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the equipment manufacturer.

Discard used batteries according to manufacturer's instructions.

VARNING

Explosionsfara vid felaktigt batteribyte.

Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.

Kassera använt batteri enligt fabrikantens instruktion.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.

Udskiftning må kun ske med batteri af samme fabrikat og type.

Levér det brugte batteri tilbage til leverandøren.

VAROITUS


Paristo voi räjähtää, jos se on virheellisesti asennettu.

Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

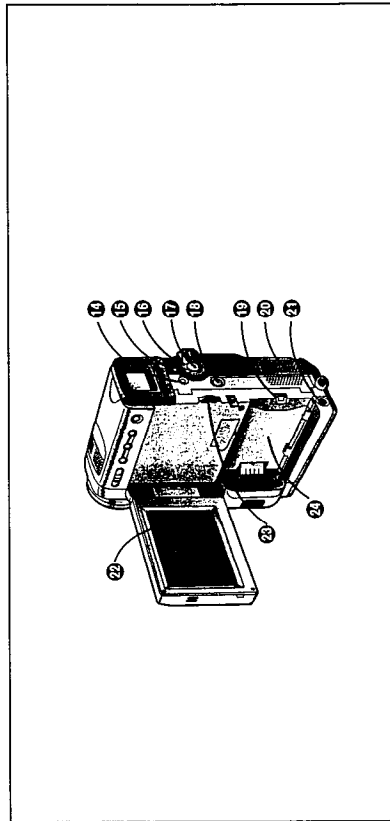
SECTION 1

GENERAL DESCRIPTIONS

Controls and Components




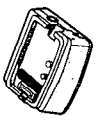





- 1 Reverse Search Button [←SEARCH] (→ 58)
Rewind/Review Button [←4] (→ 48)
Recording Check Button [RE] (→ 34)
- 2 Forward Search Button [SEARCH+] (→ 58)
Fast Forward/Cue Button [▶▶] (→ 48)
- 3 Fade Button [FADE] (→ 68)
Stop Button [■] (→ 46)
- 4 White Balance Button [W.B] (→ 82, 84)
Pause Button [II] (→ 52)
- 5 Backlight Button [BLC] (→ 34)
Play Button [▶] (→ 46, 48)
- 6 Focus Button [FOCUS] (→ 86)
- 7 Microphone (built-in, stereo)
- 8 MC Protector (→ 156)
To protect the lens against getting damaged.
- 9 Lens
- 10 Recording Lamp (→ 32)
- 11 DV Terminal (i.LINK) [i] 
To output digital signals.
Connect it to digital video equipment.
"i.LINK" is the name of the connector in accordance with the International Standard [IEEE1394-1995].
"i" is the logo marked on products conforming with the "i.LINK" specifications.
Inputting digital signals into this Movie Camera is not possible.
- 12 White Balance Sensor (→ 164)
Remote Control Sensor (→ 110)
- 13 Battery Holder Cover
When attaching the Battery or connecting the DC Input cable, remove this cover.

-10-



- 14 Menu Button [MENU] (→ 128)
- 15 Power Lamp
- 16 Selector Switch for Camera Mode/Power Off/VCR Mode [POWER] (→ 26, 32, 46, 56)
- 17 Recording Start/Stop Button (→ 32)
- 18 Photoshot Button [PHOTO SHOT] (→ 40)
- 19 Battery Eject Lever [BATT. EJECT] (→ 18)
- 20 Speaker (→ 46)
- 21 Audio-Video Output Socket [AV OUT] (→ 54, 114, 156)
When a cable is connected to this socket, the Movie Camera's built-in speaker is turned off.
- 22 LCD Monitor (→ 26)
Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD Monitor screen. However, this is not a malfunction and does not affect the recorded picture.
- 23 Multi-Function Dial [PUSH] (→ 46, 48, 52, 86, 88, 90, 128)
- 24 Battery Holder

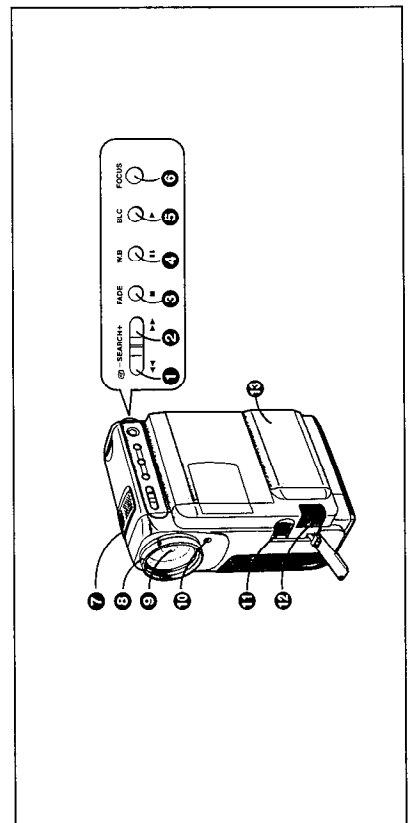
-12-

1. 	2. 	3. 
4. 	5. 	6. 
7. 	8. 	9. 

Standard Accessories

1. AC Adaptor (→ 16, 18, 140)
To supply power to the Movie Camera.
To charge the Battery.
DC Input Cable and AC Mains Cable (→ 16, 18)
To connect the AC Adaptor to the Movie Camera and to an AC mains socket.
2. Battery Pack (→ 18)
To supply the Movie Camera with power.
3. Remote Controller and Button-Type Battery (→ 100, 108)
4. Output Terminal Box [AV ONE TOUCH STATION] (→ 54, 56, 112)
Equipped with AV Sockets, Edit Socket, Digital Still Picture Terminal and Microphone socket
5. A. 21-pin Adaptor (→ 54, 114, 116, 118)
B. Headphone Conversion Adaptor (→ 156)
6. A. AV Cable (PHONO - M3) (→ 54, 114)
B. AV Cable (PHONO - PHONO) (→ 54, 114, 116, 118)
C. S-Video-Cable (→ 54, 114, 116, 118, 120, 122)
7. Hand Grip (→ 28)
8. A. Hand Strap (→ 30)
B. Lens Cap Holder for Hand Strap (→ 30)
9. Cleaning Tissue
To clean the Lens and the LCD Monitor.

-8-



The 3 Types of Power Supplies

- 1) AC Adaptor (supplied) to supply power from an AC mains socket
- 2) Car Adaptor Cord (optional) to supply power from a Cigarette Lighter Socket
- 3) Battery (supplied) (→ 18)

■ Supplying Power from an AC Mains Socket

- 1 Insert the battery-shaped connector of the DC Input Cable into the Battery Holder on the Movie Camera and slide it toward the front until it locks with a click.
- 2 Connect the other plug of the DC Input Cable to the [DC OUT] Socket on the AC Adaptor.

3 Connect the AC Mains Cable to the AC Adaptor.

4 Connect the other end of the AC Mains Cable to an AC mains socket.

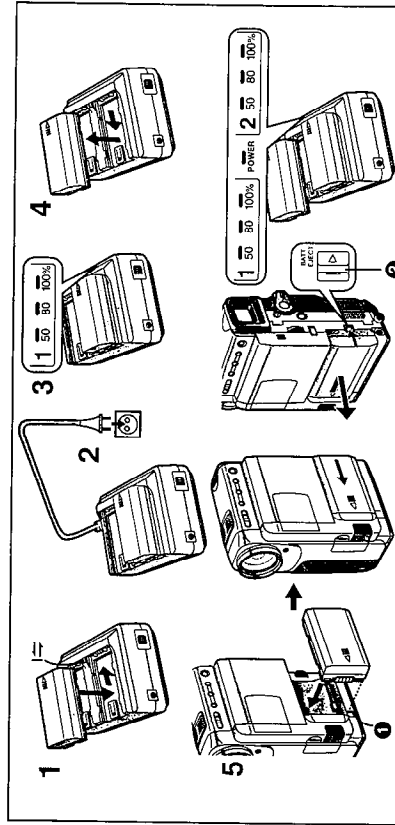
- Before disconnecting the AC Mains Cable, set the [POWER] Switch on the Movie Camera to [OFF].
- If you use the Movie Camera for a long time, it becomes warm. However, this is normal.

■ Supplying Power from the Cigarette Lighter Socket in a Car

The use of the Car Adaptor Cord (VW-KA7E; optional) together with the AC Adaptor makes it possible to supply power to the Movie Camera in a car for recording and playback. It also allows charging the Movie Camera's Battery.

- After use, be sure to disconnect the Car Adaptor Cord from the Cigarette Lighter Socket.
- Be sure to start the car engine before you connect the Car Adaptor Cord, otherwise the fuse may blow.
- Also read the operating instructions of the Car Adaptor Cord.

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■ Supplying Power with the Battery

Before use, fully charge the Battery.

- 1 Place the Battery on the AC Adaptor as shown above and slide it horizontally until it stops.
- 2 Connect the AC Mains Cable to an AC mains socket.
- 3 When all three Charge Lamps on the AC Adaptor are lit, charging is finished.
 - The Charge Lamps [50%], [80%] and [100%] flash and then remain lit one after another. These lamps indicate the approximate charging condition reached.
- 4 Remove the Battery by sliding it in the opposite direction of Step 1 above. Also disconnect the AC Mains Cable.

5 After aligning the front edge of the Battery with the mark ① at the bottom edge of the Movie Camera, push it in and then slide it toward the front until it locks with a click.

Removing the Battery from the Movie Camera While pressing the [BATT. EJECT] Lever ②, slide the Battery toward the rear and then remove it.

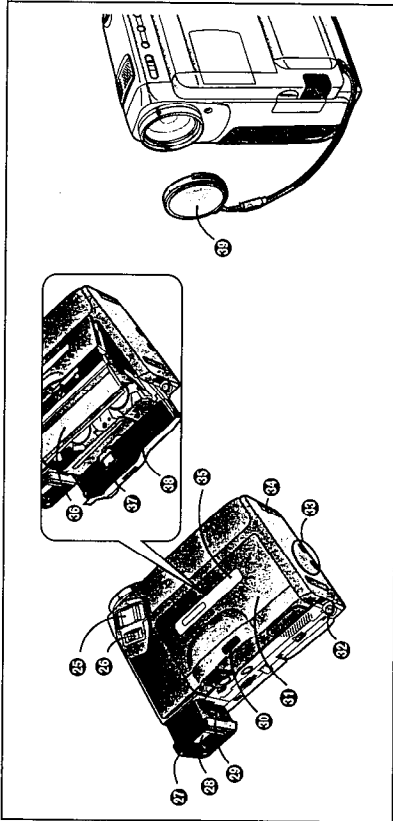
- Be careful not to drop the Battery by accident.
- Before removing the Battery, set the [POWER] Switch to [OFF].

Charging Two Batteries

If you attach two Batteries to the AC Adaptor, they will be charged one after the other. To charge, follow Steps 1 - 3.

- Charging starts from Battery 1. At this time, the Charge Lamps for Battery 2 show the remaining charge in the Battery 2. (If the remaining charge is less than 50%, no Charge Lamp is lit.)

-18-



25 Zoom Lever [W/T] (→ 38)

26 Mode Selector Switch [AUTO/MNL/AE SELECT] (→ 32, 70, 82, 84, 86, 88, 90)

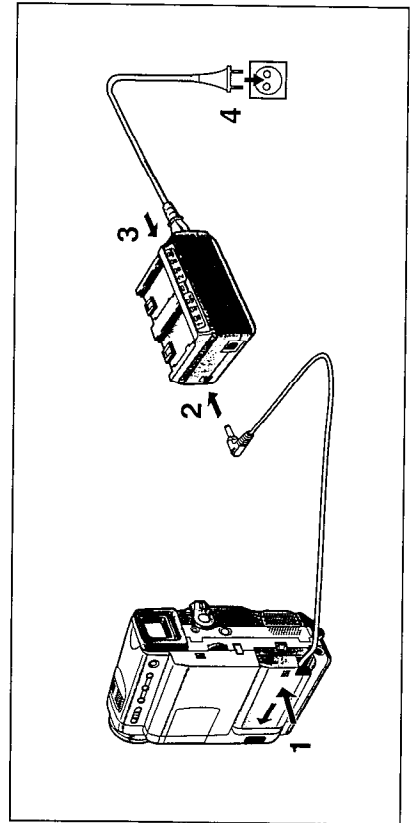
27 Eyecup

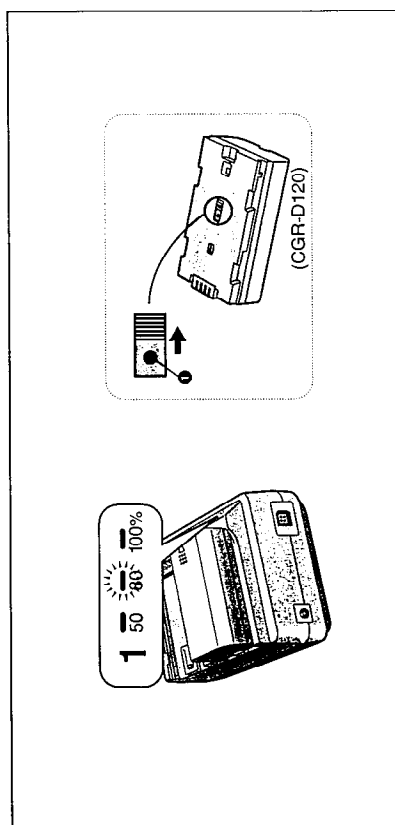
28 Finder (→ 26)

Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the Finder screen. However, this is not a malfunction and does not affect the recorded picture.

29 Eyepiece Corrector Knob (→ 26)

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Charging Time and Maximum Time for Continuous Recording

Battery No.	Charging Time	Max. Continuous Recording Time
CGR-D110 (Supplied)	1 h 20 min	1 h 5 min (55 min)
CGR-D120	1 h	1 h 15 min (1 h 5 min)
CGR-D210	1 h 50 min	2 h 10 min (1 h 55 min)
CGR-D220	2 h	2 h 40 min (2 h 20 min)
CGR-D815	5 h 20 min	9 h (7 h 40 min)

(The times shown in the above chart are approximations. The figures in parentheses show the recording time when using the LCD Monitor.)
The times listed above for your information indicate the duration of recording performed at an ambient temperature of 20°C and 60% relative humidity. The charging time may be longer when you charge the battery at higher or lower temperature.
• During use and battery charging, the battery and the movie camera's body will become warm. This is not a malfunction.

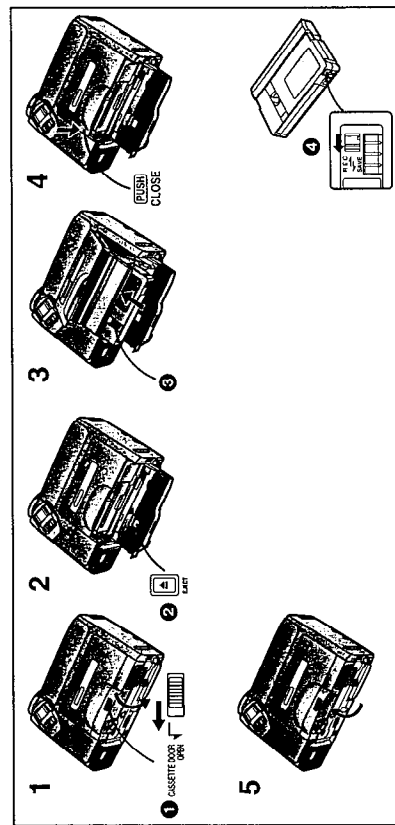
- When you repeatedly stop and restart recording, the recording time per battery is shorter than listed above.
- If you do not use the battery for a long time, please read "Precautions for Storage" (→ 154).

When the Charge Lamps Flash as Warning

If the ambient temperature is extremely low or extremely high, the charge lamps on the AC Adaptor flash. They also flash when some malfunction has occurred in the battery or the AC Adaptor. For details, read "When the Charge Lamps on the AC Adaptor Flash as Warning" (→ 152).

Using Optional Batteries Equipped with Charge Confirmation Marker

You can use this marker to easily distinguish between charged and discharged batteries.
For example, slide the knob so that the red dot (●) is visible after the charging is completed.
(The battery CGP-D110 is not equipped with a Charge Confirmation Marker.)



Inserting the Cassette

- Slide the [CASSETTE DOOR OPEN] Lever (●) to the left and simultaneously open the Lower Cassette Compartment Cover completely.
- Press the [EJECT] Button (●). The Cassette Holder slides out.
- Insert the cassette with its window in position (●) shown above.
- Press on the [PUSH CLOSE] mark to close the Upper Cassette Compartment Cover. The Cassette Holder with the cassette slides back inside. Confirm that the Cassette Holder has retracted completely.
- Close the Lower Cassette Compartment Cover.

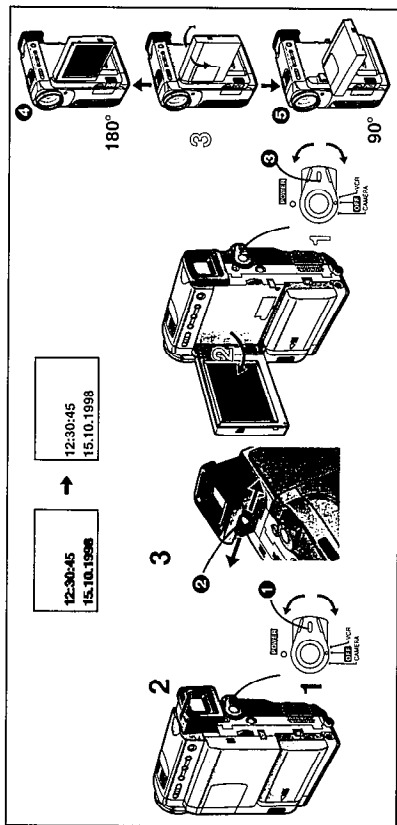
- If the AC Adaptor or Battery is used to supply power, it is possible to insert or eject the cassette without turning on the Movie Camera.
- When inserting the cassette, make sure it faces in the right direction and then push it in until it stops.
- When you insert a cassette onto which you have recorded before, use the Camera Search Function (→ 58) to search for the position from which you want to continue recording.
- When you insert a new cassette, rewind the tape to the beginning before starting to record.
- Preventing Accidental Erasure of Recordings
Opening the cassette's erasure prevention slider (●) (sliding it in the direction of the [SAVE] arrow) prevents recording. To record again, close the erasure prevention slider (slide it in the direction of the [REC] arrow).

- In the following cases, mosaic-like patterns may appear in the playback picture, or the picture may not be played back correctly.
 - When a cassette recorded in the LP Mode on this Movie Camera is played back on other digital video equipment.
 - When a cassette recorded in the LP Mode on other digital video equipment is played back on this Movie Camera.
 - When a cassette recorded in the LP Mode on this Movie Camera is played back on digital video equipment not featuring the LP Mode.
 - In the Slow Motion or Still Advance Playback Mode. (→ 50, 52)
 - When using the Camera Search Function. (→ 58)
- As the recording track width in the LP Mode is smaller than the head width, recording new sound onto an already recorded cassette (audio dubbing) (→ 96) is not possible.

LP Mode

The desired recording speed can be selected with [REC SPEED] on the [CAMERA MENU2] Menu.

If you select the LP Mode, the possible recording time is 1.5 times as long as in the SP Mode. Recording in the LP mode does not deteriorate the picture quality. However, the playback picture may contain mosaic-like patterns and certain functions may be restricted.



Using the FINDER

Before using the FINDER, adjust it to your eyesight so that the indications in the FINDER are clear and easy to read.

- 1 Set the [POWER] Switch to [CAMERA] or [VCR].
- 2 Turn the switch while pressing the button ①.
- 3 Slide the FINDER backward.

Adjust by sliding the Eyepiece Corrector Knob ②.
It is also possible to adjust the brightness of the FINDER with the item [LCD/VEF SET] on the [CAMERA MENU3] Menu or [VCR MENU2] Menu. (→ 142)

Using the LCD Monitor

You can also record while viewing the picture on the opened LCD Monitor.

- 1 Set the [POWER] Switch to [CAMERA] or [VCR].
- 2 Turn the switch while pressing the button ③.
- 3 Open the LCD Monitor.

The FINDER turns off.

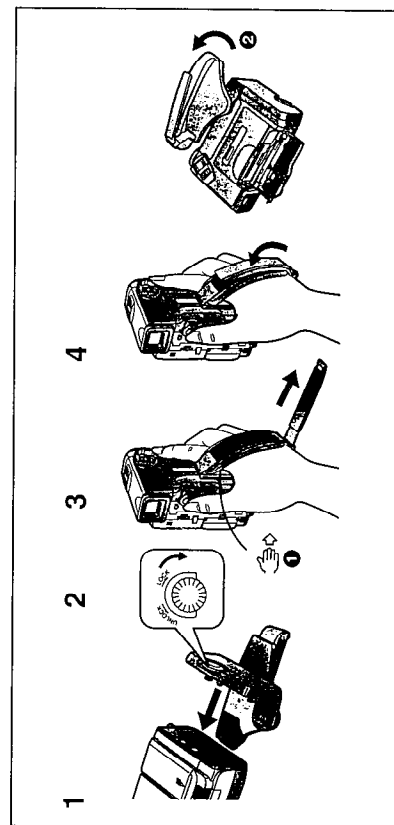
Adjusting the Angle

- 3 Adjust the angle of the LCD Monitor according to the recording angle.
• The LCD Monitor rotates upward a maximum of 180° ④ and downward by a maximum of 90° ⑤ from its normal vertical position. Trying to forcefully rotate it beyond this range could seriously damage the Movie Camera.
- It is also possible to adjust the colour saturation and brightness of the LCD Monitor with the item [LCD/VEF SET] on the [CAMERA MENU3] Menu or [VCR MENU2] Menu. (→ 142)

Closing the LCD Monitor

After use, turn the LCD Monitor upright and close it securely.

-26-



Attaching the Hand Grip

The Hand Grip ensures reduced hand fatigue even during longer recording, and the integrated Grip Belt protects the Movie Camera against accidental falls.

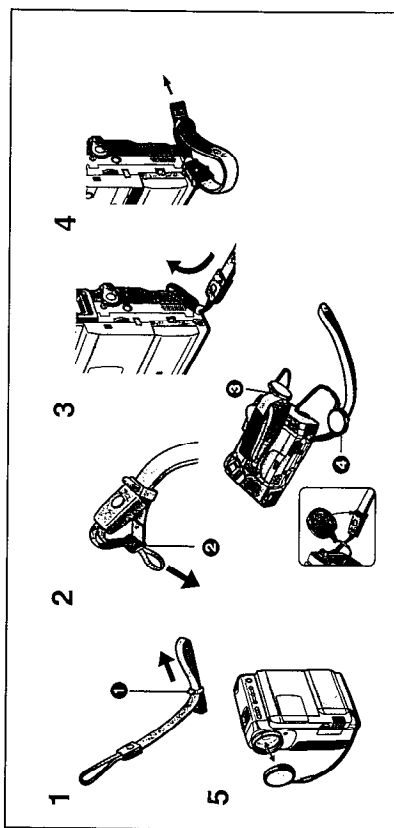
- 1 Place the Hand Grip on the side and bottom of the Movie Camera so that the Hand Grip's screw is aligned with the tripod receptacle.
- 2 Tighten the screw by turning it in the direction of [LOCK].

- 3 Pass your hand through the Grip Belt in the direction indicated by the mark ① and adjust its length.

- 4 Fold up the end of the Grip Belt to securely fasten the velcro tape closure.
Before attaching the Output Terminal Box [AV ONE TOUCH STATION] to the Movie Camera, detach the Hand Grip.

- When inserting and taking out the cassette, turn the Hand Grip as shown above ② so that it does not prevent the Upper Cassette Compartment Cover from opening.
- When using the Movie Camera, also loop the Hand Strap (→ 30) around your wrist for added safety, before passing your hand under the Grip Belt.
- To carry the Movie Camera, do not hold it only by the Hand Grip.

-28-



Attaching the Hand Strap

Attaching the Hand Strap makes it convenient to carry the Movie Camera.

- 1 Pass the longer loop of the Hand Strap through the larger hole ① of the Lens Cap Holder.
- 2 Pass the shorter loop of the Hand Strap through the smaller hole ② of the Lens Cap Holder.
- 3 Pull the small loop at the end of the Hand Strap through the Hand Strap Holder.

- 4 Pass the big loop of the Hand Strap through the small loop.

When using the Hand Strap to carry the Movie Camera, loop the Hand Strap around your wrist and be careful not to accidentally hit the Movie Camera against hard objects.

Handling the Lens Cap

Before you start recording, remove the Lens Cap.

- 5 Attach the removed Lens Cap either to the Lens Cap Holder on the Grip Belt ③ or on the Hand Strap ④.
When not actually recording, always attach the Lens Cap to the Lens to protect it.

-30-

Checking if the Picture Is Recorded (Recording Check)

To play back the final few seconds of the last recorded scene in the Recording Pause Mode.

- 1 Press the Recording Check Button [CHK] briefly in the Recording Pause Mode.

The [CHK] Indication ② appears. After checking, the Movie Camera returns to the Recording Pause Mode.

- For Recording Check, the Movie Camera must be in the same mode (SP or LP) as used for recording, otherwise the playback picture is distorted.

Recording Backlit Scenes (Backlight Compensation)

To prevent the backlit subject from being recorded very dark.

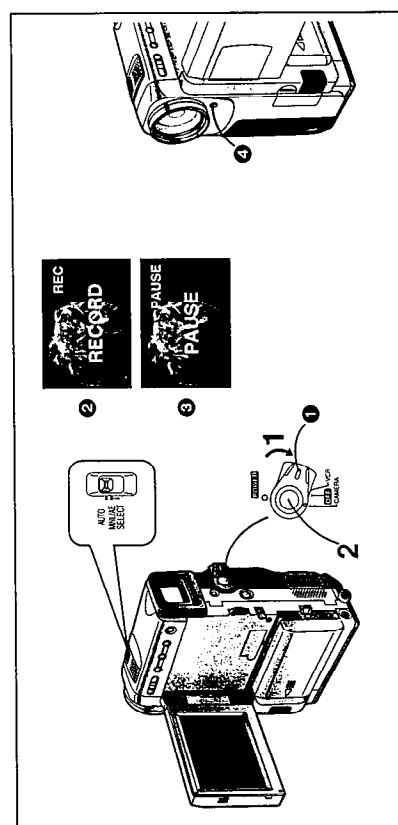
(Backlight means that the light falls on the subject from behind, i.e. the subject is between the light source and the Movie Camera.)

- 1 Keep the Backlight Button [BLC] pressed.

The backlight is being compensated as long as you keep the Button pressed, and the subject is recorded more brightly. (The picture brightens up as a whole.)

Returning to Normal Recording
Release the Backlight Button [BLC].

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Recording

After setting the [POWER] Switch to [CAMERA] and the Mode Selector Switch to [AUTO], you can simply press the Start/Stop Button to start recording. In this case, the Movie Camera adjusts the focus and white balance fully automatically.

- Depending on the light source and recording situation, correct automatic focusing and white balance adjustment may not be possible. In such cases, adjust them manually.

Focus: (→ 86); White Balance: (→ 82, 84)

- 1 Set the [POWER] Switch to [CAMERA].

- 2 Press the Start/Stop Button.

Recording starts. The [RECORD] indication appears briefly and then changes to [REC].

To pause recording:
Press the Start/Stop Button again. The [PAUSE] Indication appears.

To finish recording:
Set the [POWER] Switch to [OFF].

Turn the switch while pressing the button ①.

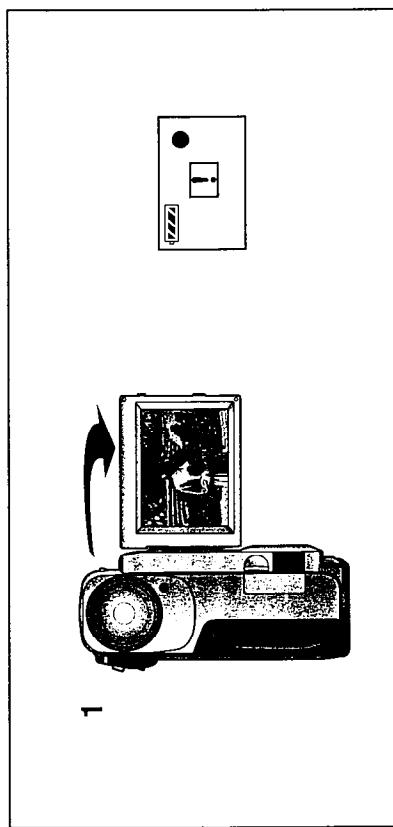
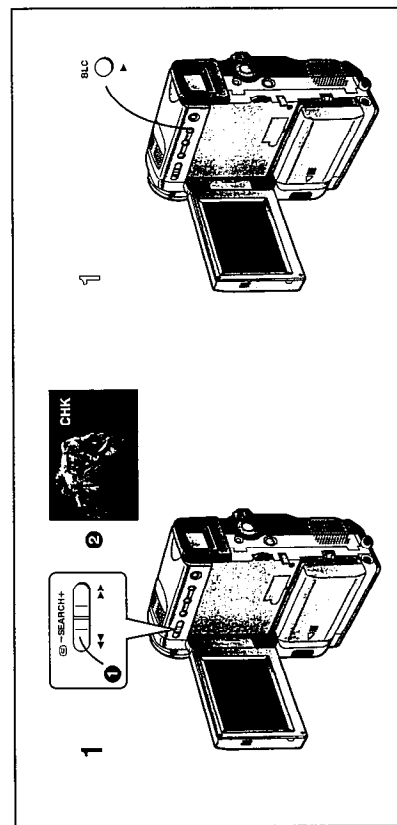
- If you leave the Movie Camera in the Recording Pause Mode for more than 6 minutes, it automatically switches off to protect the tape and to conserve battery power. To resume recording from this condition, set the [POWER] Switch to [OFF] and then to [CAMERA] again.

Recording Lamp (Tally Lamp)

The Recording Lamp lights during recording to let the people in front of the Movie Camera know that recording is being performed.

If you set [REC LAMP] on the [CAMERA MENU3] Menu to [OFF], the Recording Lamp does not light.

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Recording Yourself (Recording with the LCD Monitor Facing Forward)

This makes it possible to record yourself while viewing the picture on the LCD Monitor or to show the persons in front of the Movie Camera the picture being recorded.

- 1 Open the LCD Monitor and turn it so that it faces forward (lens side).

Opening the LCD Monitor automatically turns off the Finder. However, when you turn the LCD Monitor forward, the picture also appears in the Finder.

This lets you aim the Movie Camera and view the picture in the Finder, while the persons in front of the Movie Camera can check the picture on the LCD Monitor during recording.

Mirror Mode

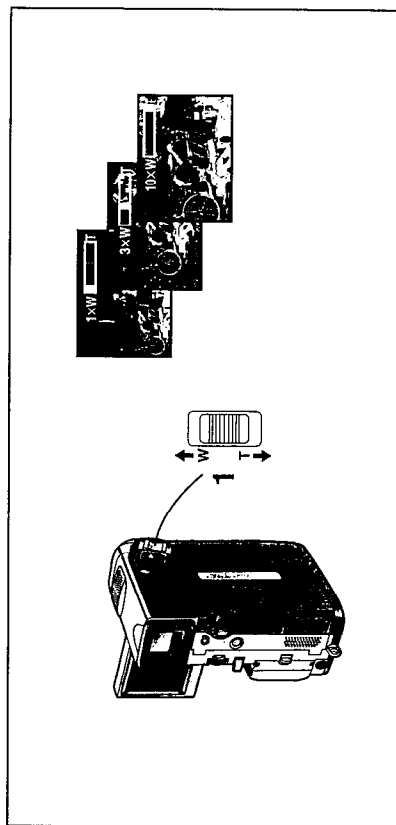
If you set [SELF-SHOOT] on the [CAMERA MENU3] Menu to [MIRROR], the picture displayed on the LCD Monitor is reversed like a mirror-image. When recording yourself with the LCD Monitor facing forward, the picture as it is being recorded might look unusual. We usually look at ourselves in the mirror and, although the image we see there is actually reversed right and left, it feels more natural because we are used to it. This Movie Camera features the Mirror Mode which displays the picture as a mirror-image. However, even if you have selected the Mirror Mode, the picture is recorded in the normal way.

- In the Mirror Mode, only the following indications are displayed.

- [CHK]: Recording Pause
- [BATT]: Remaining Battery Power

When the General Warning/Alarm Indication [!] appears, turn the LCD Monitor backward so that you can confirm the actual Warning/Alarm Indication.

-36-



Recording with zoom function (Zooming In/Out)

Recording close-ups of your subjects and recording wide-angle shots add special effects to your videos.

- 1 Slide the [W/T] Zoom Lever toward [T] to zoom in on a subject, and toward [W] to zoom out.

- The Zoom Magnification Indication appears for a few seconds.
- The farther you slide the [W/T] Zoom Lever toward [W] or [T], the faster the zooming speed becomes.
- During recording, the zooming speed is lower than during recording pause.

Enlarging Your Subjects Even More (Digital Zooming)

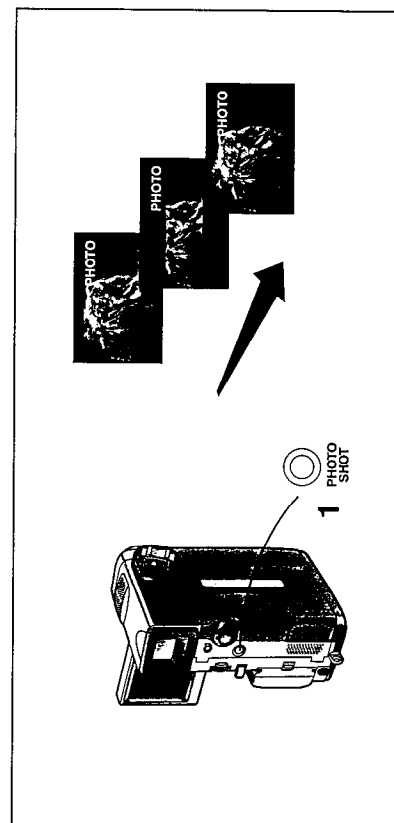
If you set [EFFECT1] on the [CAMERA MENU1] Menu to [Z] & [ZOOM] or [ZOOM], it is possible to further enlarge the subject.

- The [D.ZOOM] Indication appears.
- 20X: Digital zooming up to 20X.
- 100X: Digital zooming up to 100X.
- Up to 10X, the Zoom Magnification is done optically.
- The higher the Digital Zoom Magnification, the lower is the picture quality.
- For the item [D.ZOOM] on the [CAMERA MENU1] Menu, you can select either [20X] or [100X] as the maximum zoom magnification.
- The Digital Zoom Function only works when [EFFECT1] on the [CAMERA MENU1] Menu is set to [Z] & [ZOOM] or [ZOOM].

Recording Extra Close-up Shots of Small Subjects (Macro Close-up Function)

When the zoom magnification is 1X, the Movie Camera can focus on subjects down to a distance of approximately 35 mm between lens and subject. This allows recording very small subjects such as insects.

- When you have zoomed to the tele setting, precise focusing is only possible on subjects no closer than 1.2 metres.



Using the Movie Camera as a Digital Still Camera (Photoshot)

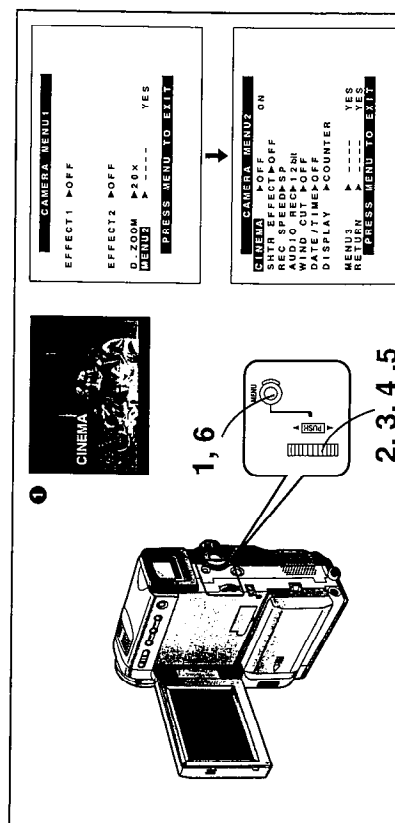
With this function, you can record still pictures with sound for approximately 7 seconds each. This function is convenient for example for pictures that you want to print on a Video Printer.

- 1 Press the [PHOTO SHOT] Button. (This function can be used during recording, too.)

The Movie Camera records a still picture for approximately 7 seconds and then switches over to the Recording Pause Mode.

- If you set [SHTR EFFECT] on the [CAMERA MENU2] Menu to [ON], the screen blinks briefly and a simulated shutter click sound can be heard when you press the [PHOTO SHOT] Button. This audiovisual effect is also recorded.
- With the still pictures that you have recorded in the Photoshot Mode, you can do the following:
 - Index Search (→ 62, 64)
 - (However, searching for the picture(s) recorded at the beginning of the tape may not be possible.)
 - Automatic printing (→ 122)

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Recording in the Cinema Mode (Cinema Mode)

This mode lets you record in the cinema-like wide-screen format.

- 1 Press the [MENU] Button. The [CAMERA MENU1] Menu appears.
- 2 Turn the [PUSH] Dial to select [MENU2].
- 3 Press the [PUSH] Dial to select [YES]. The [CAMERA MENU2] Menu appears.

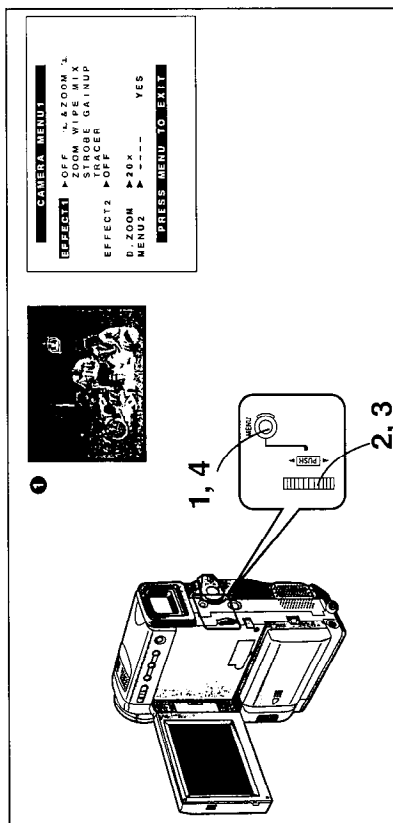
- 4 Turn the [PUSH] Dial to select [CINEMA].

- 5 Press the [PUSH] Dial to select [ON]. Black bars appear at the top and bottom on the screen. ①

- 6 Press the [MENU] Button to exit the Menu.

Cancelling the Cinema Mode
Set [CINEMA] on the [CAMERA MENU2] Menu to [OFF].

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Recording with Minimised Camera Shake (Super Image Stabilizer)

In recording situations where shaking of the Movie Camera is likely to happen, for example when you have zoomed in on a distant subject or when you record while walking, you can use this function to stabilize the image.

- In case of very strong camera shake, it may not be possible to stabilize the picture.

- 1 Press the [MENU] Button.
The [CAMERA MENU1] Menu appears.
- 2 Turn the [PUSH] Dial to select [EFFECT1].
- 3 Press the [PUSH] Dial to select [ZOOM] or [ZOOM] 1.

- 4 Press the [MENU] Button to exit the Menu.
The [ZOOM] Indication 1 appears.

- In a dimly lit place, the Super Image Stabilizer Function may not work. In this case, the [ZOOM] Indication flashes.
- Under fluorescent lamps, the picture brightness may fluctuate and the colours may be unnatural.
- After-image distortion may occur.
- When you use a tripod, we recommend to turn the Super Image Stabilizer Function off.

Cancelling the Super Image Stabilizer Function
Set [EFFECT1] on the [CAMERA MENU1] Menu to [OFF].

Viewing the Just Recorded Scenes

on the Movie Camera (Playback)

You can play back recorded scenes right after recording.

- 1 Set the [POWER] Switch to [VCR].
- 2 Press the switch while pressing the button 1.
the tape.
- 3 Press the Play Button [▶] to start playback.

To stop playback:

- Press the Stop Button [■].
- If a cassette recorded with copyright protection signal is played back, the screen becomes black.

- **Adjusting the Sound Volume**
Keep the [PUSH] Dial 2 pressed until the [VOLUME] Indication 3 appears. Then, turn the [PUSH] Dial to adjust the volume. After adjusting, press the [PUSH] Dial to make the [VOLUME] Indication disappear. To adjust the volume with the Remote Controller, press the [T] or [W] Button to make the [VOLUME] Indication appear. You can then increase the volume by pressing the [T] Button or decrease it by pressing the [W] Button. A few seconds after finishing the adjustment, the [VOLUME] Indication disappears.

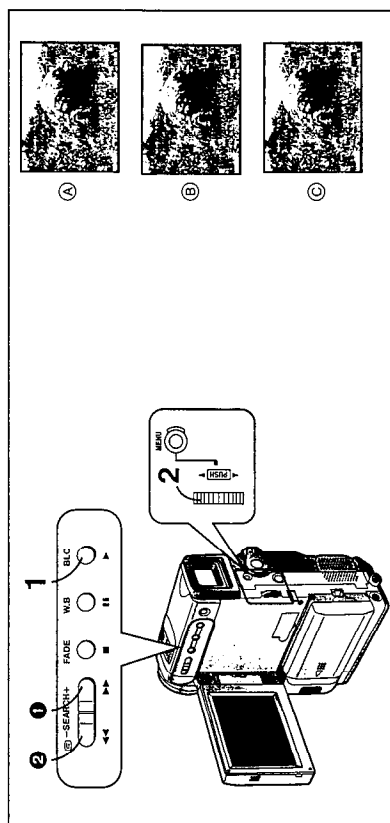
Repeat Playback

- If you keep the Playback Button [▶] pressed for more than 5 seconds, the Movie Camera switches over to the Repeat Playback Mode and the [R ▶] Indication appears. To cancel the Repeat Playback Mode, set the [POWER] Switch to [OFF].

Making the Date/Time Indication Appear

This Movie Camera automatically records the date and time, however not directly in the picture but as part of the sub code (→ 158).

To make the Date/Time Indication appear, set [DATE/TIME] on the [VCR MENU1] Menu to the desired setting.



Searching for a Scene That You Want to Play Back

Cue Playback 1

Keep the Cue Button [▶▶] 1 pressed during playback.

Review Playback 2

Keep the Review Button [◀◀] 2 pressed during playback.

Search Lock Function

For longer Cue or Review Playback, press the Cue Button [▶▶] or the Review Button [◀◀] only briefly. As this locks the search function, you do not need to keep the button pressed for a long time.

• To resume normal playback, press the Play Button [▶].

• In Cue and Review Playback, pictures with fast-moving subjects may contain mosaic-like patterns.

Hyper Check Function

• If you press the Fast-forward Button [▶▶▶] during fast-forwarding of the tape or the Rewind Button [◀◀◀] during rewinding of the tape, Cue Playback or Review Playback continues for as long as you keep the Button pressed.

- At the beginning and end of Cue Playback or Review Playback, some momentary picture distortion may occur.

Variable Speed Search Function 3

It is possible to change the speed of Cue Playback or Review Playback.

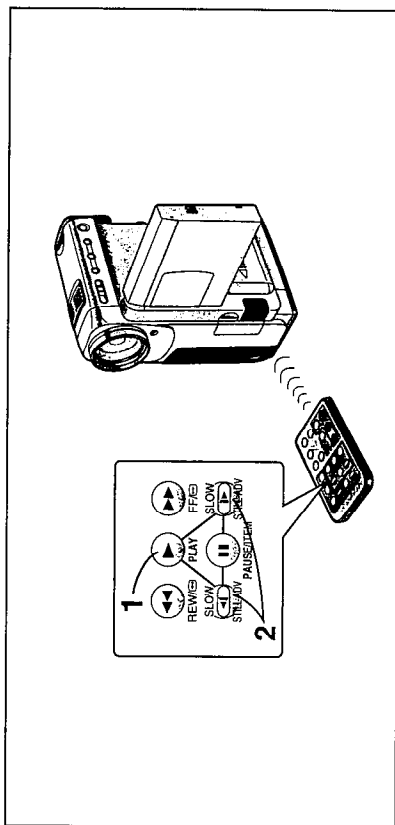
- 1 Press the Play Button [▶] during playback.
- 2 Turn the [PUSH] Dial to select the desired search speed.

The Variable Speed Search function offers a choice of five playback speeds (1X, 2X, 5X, 10X, 20X) both in forward direction and reverse direction.

Returning to Normal Playback

Press the Play Button [▶]. Playback continues at normal speed.

- During Variable Speed Search (except at 1X speed in forward direction), mosaic-like patterns appear in the picture.
- When using the Variable Speed Search Function, the sound is muted.



Playing Back in Slow Motion (Slow Motion Playback)

- 1 Press the Play Button [▶].
- 2 Press the Slow Motion/Still Advance Button [◀] or [▶] on the Remote Controller.
Pressing the [◀] Button starts slow motion playback in reverse direction, and pressing the [▶] Button starts slow motion playback in forward direction.

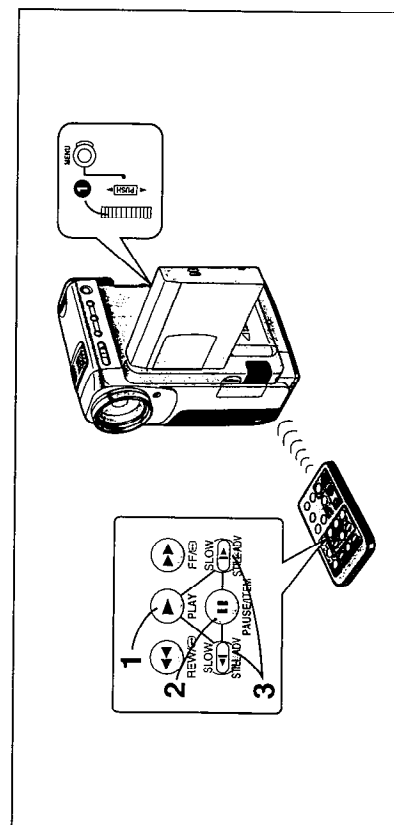
Scenes recorded in the SP Mode are played back at approximately 1/5th of the normal speed.
Scenes recorded in the LP Mode are played back at approximately 1/3rd of the normal speed.

•During slow motion playback in reverse direction, the Time Code Indication may not be accurate.

Resuming Normal Playback

Press the Play Button [▶].
Playback continues with normal speed.

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Playing Back Still Pictures and Advancing Them One by One (Still Playback/Still Advance Playback)

You can freeze the action during playback and advance the still pictures one by one.

- 1 Press the Play Button [▶].
- 2 Press the Pause Button [⏸].
The playback picture stops in the Still Playback Mode.
- 3 Press the Slow Motion/Still Advance Button [◀] or [▶] on the Remote Controller.
Pressing the [◀] Button advances the still picture frame by frame in reverse direction. Pressing the [▶] Button advances the still picture frame by frame in forward direction.

- Each press of the [◀] Button advances to the next still picture in reverse direction. Each press of the [▶] Button advances to the next still picture in forward direction. Keeping either button pressed continuously advances the still picture frame by frame until you release the button.
- If you leave the Movie Camera in the Still Playback Mode for more than 6 minutes, it switches over to the Stop Mode to protect the video heads against excessive wear.
- During Still Advance Playback, the Time Code Indication may not be accurate.

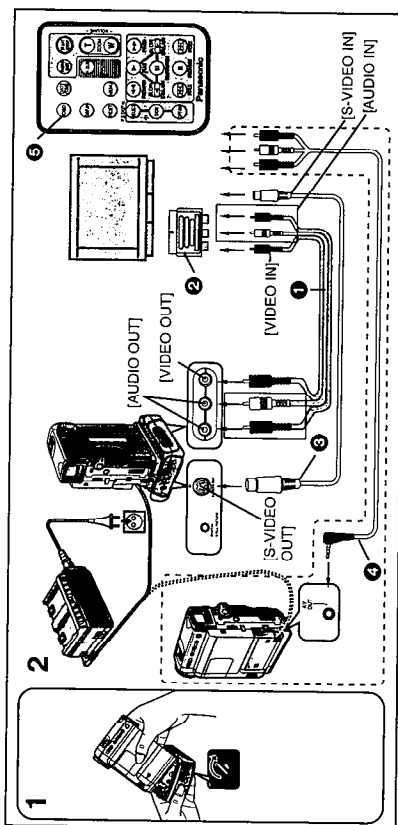
Resuming Normal Playback

Press the Play Button [▶].
Playback continues with normal speed.

Using the Jog Dial (Jog Playback)

By turning the Jog Dial ([PUSH] Dial) [1] on the Movie Camera in the Still Playback Mode, you can advance the still pictures one by one in forward or reverse direction.

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Playing Back on a TV (With the Output Terminal Box [AV ONE TOUCH STATION] Attached)

Attaching the Output Terminal Box [AV ONE TOUCH STATION] to the Movie Camera makes it possible to play back recorded scenes on a TV.

- 1 Attach the Output Terminal Box [AV ONE TOUCH STATION]. (→ 112)
- 2 Connect the Video and Audio output Socket on the Output Terminal Box [AV ONE TOUCH STATION] with the Scart Input Sockets (or separate Video and Audio Input Sockets) on the TV.
Use the AV Cable (PHONO-PHONO) [1] and 21-pin Adaptor [2] to connect to the TV. If your TV is equipped with an S-Video Socket, also connect the S-Video Cable [3].

Easy Playback on a TV

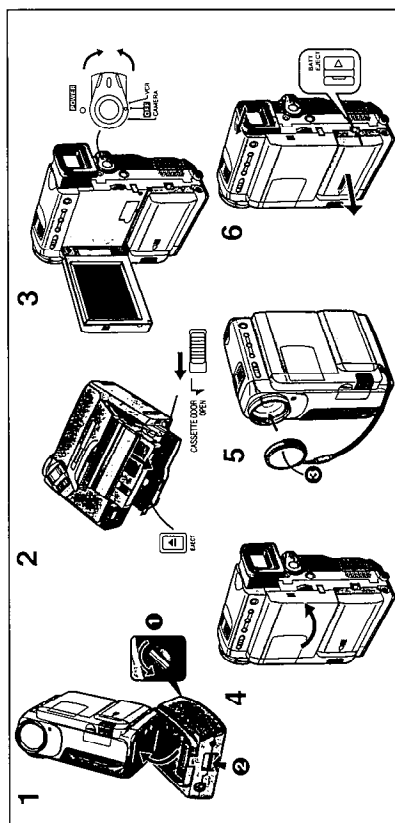
Instead of connecting the Movie Camera to the TV through the Output Terminal Box [AV ONE TOUCH STATION], as described in step 2 above, you can use the AV Cable (PHONO-M3) [4] to connect [AV OUT] on the Movie Camera directly to the Video and Audio Input Sockets on the TV.

- Before connecting, turn off both the Movie Camera and the TV.
- If a cassette recorded with copyright protection signal is played back, the screen becomes black. However, scenes recorded with this Movie Camera do not contain a copyright protection signal.

Making the Indications Appear on the TV Screen

Press the [OSD] Button [5] on the Remote Controller. The On-Screen Indications also appear on the TV screen.

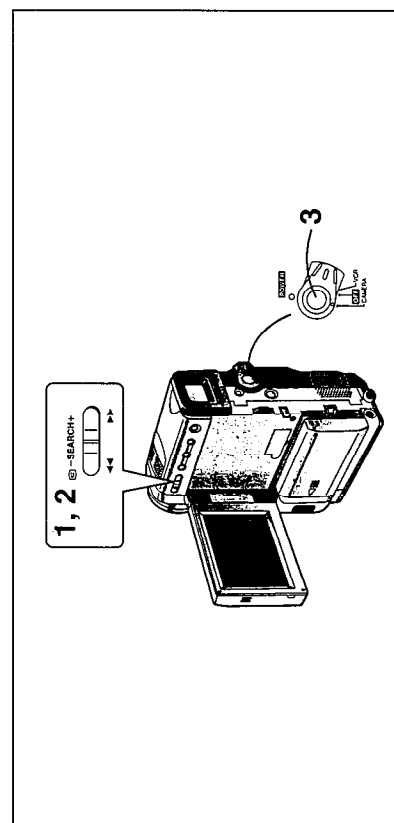
-54-



After Use

- 1 Loosen the locking screw ❶ and remove the Output Terminal Box [AV ONE TOUCH STATION] while pressing the [PUSH RELEASE] Button ❷. Hold both the Movie Camera and the Output Terminal Box firmly to prevent them from dropping.
- 2 Take out the cassette.
- 3 Set the [POWER] Switch to [OFF].
- 4 Close the LCD Monitor.
- 5 Attaching the Lens Cap ❸ to the Lens to protect it.
- 6 Remove the Battery and retract the Finder. (→ 18)

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Viewing Recorded Scenes During Recording Pause (Camera Search)

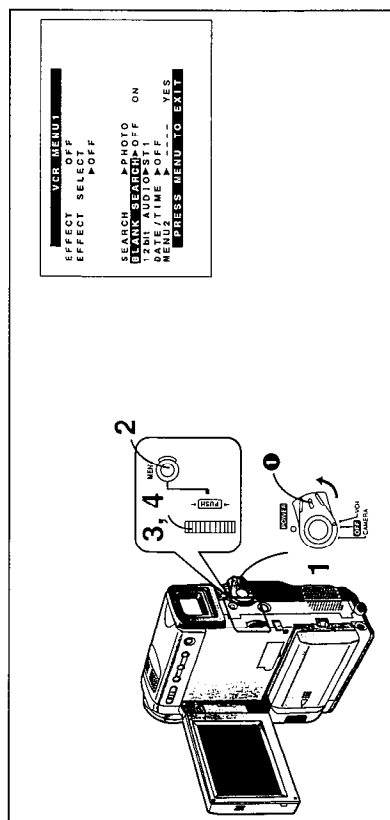
You can view recorded scenes when the Movie Camera is in the Recording Pause Mode. The Camera Search Function is convenient to search for a scene from which you want to start recording a new scene with smooth scene-to-scene transition.

- 1 Keep the Reverse Search Button [-SEARCH] or the Forward Search Button [SEARCH+] pressed for more than 1 second.
Pressing the [-SEARCH] Button plays back the picture in reverse direction.
Pressing the [SEARCH+] Button plays back the picture in forward direction.

Starting to Record from the Desired Position

- 2 Release the pressed Search Button.
The Movie Camera is in the Recording Pause Mode.
 - 3 Press the Start/Stop Button to start recording.
The Movie Camera starts recording a new scene with smooth scene-to-scene transition.
- In the Camera Search Mode, the picture may contain mosaic-like patterns. However, this is a phenomenon particular to digital video and completely normal.
 - If the Recording Speed Modes (SPLP) of the previous and the new recording are different, the playback picture may be distorted.

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Searching for the End of the Recorded Part on a Cassette (Blank Search)

With the Blank Search Function, you can quickly locate the end of the recorded part on a cassette (or a blank part between recordings).

- 1 Set the [POWER] Switch to [VCR].
Turn the switch while pressing the button ❶.
 - 2 Press the [MENU] Button.
The [VCR MENU1] Menu appears.
- 3 Turn the [PUSH] Dial to select [BLANK SEARCH].
 - 4 Press the [PUSH] Dial to select [ON].
Approximately 1 second before the end of the last recorded scene, the Movie Camera switches over to the Still Playback Mode.
- If there is no blank part on a cassette, the Movie Camera stops at the end of the tape.
 - If you set the [POWER] Switch to [CAMERA] and then start recording after the Blank Search has finished, the new scene will be joined to the end of the last recorded scene with a smooth transition.

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VCR MENU1

EFFECT OFF

EFFECT SELECT

EFFECT OFF

SEARCH PHOTO SCENE

BLANK SEARCH OFF

12bit AUDIO ST1

DATE/TIME OFF

MENU2 YES

PRESS MENU TO EXIT

CAMERA MENU3

LCD MODE NORMAL

LCD/EVF SET OFF

REMOTE VCR1

SELF SHOOT NORMAL

C.RESET OFF

SCENE INDEX 2 HOUR DAY

REC LAMP OFF

BACK SOUND OFF

BACK SET OFF

RETURN YES

PRESS MENU TO EXIT

Searching for the Beginning of Recorded Scenes Marked with Index Signal (Index Search)

To allow easy searching for desired scenes, this Movie Camera automatically records index signals during recording as follows:

1 Photostill Index Signal

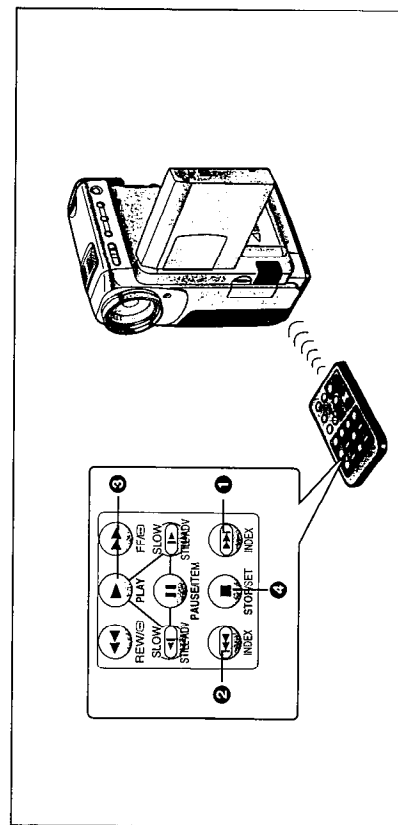
To search for still pictures recorded in the Photostill Mode (→ 40) and to use for automatic printing (→ 122).
A photostill index signal is automatically recorded every time you record a still picture in the Photostill Mode.
• However, in the Continuous Photostill Mode (→ 40), no photostill index signals are recorded.

2 Scene Index Signal

To search for the beginning of recorded scenes. A scene index signal is automatically recorded in the following cases:

- When you start recording after inserting a cassette.
- According to the setting of [SCENE INDEX] on the [CAMERA MENU3] Menu:
[2 HOUR]: An index signal is recorded when recording is restarted after a lapse of more than 2 hours.
[DAY]: An index signal is recorded when recording is restarted after the date has changed since the last recording.
- While an index signal is being recorded, the [INDEX] indication flashes for a few seconds.

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Searching for Photostill Pictures (Photostill Index Search)

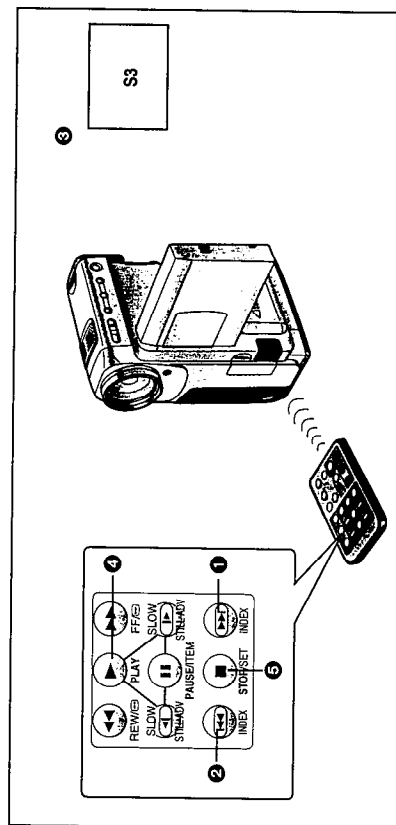
- Set the [POWER] Switch to [VCR].
- Set [SEARCH] on the [VCR MENU1] Menu to [PHOTO].
(The initial setting is [PHOTO].)

Photostill Index Search in Forward Direction
Press the Index Button [▶] 1 on the Remote Controller.

Photostill Index Search in Reverse Direction
Press the Index Button [◀] 2 on the Remote Controller.

- At every press of the corresponding button, the tape is fast-forwarded or rewound to the next still picture recorded in the Photostill Mode.
After reaching the next still picture, the still picture is played back continually, however the sound only for approximately 4 seconds. (If you leave the Movie Camera in the Still Playback Mode for more than 6 minutes, it switches over to the Stop Mode to protect the video heads against excessive wear.)
- The Photostill Index Search may not work correctly for still pictures recorded near the beginning of the tape.
- As no photostill index signals are recorded for still pictures recorded in the Continuous Photostill Mode (→ 40), the Photostill Index Search Function cannot be used to search for these still pictures.
- If you keep the [◀] or [▶] Button pressed for more than 2 seconds, the Intro Search Function is activated and it plays back all still pictures recorded in the Photostill Mode on the cassette one after another for a few seconds each.
(To cancel the Intro Search Function, press the Play Button [▶] 3 or the Stop Button [■] 5.)

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Searching for the Beginning of Recorded Scenes (Scene Index Search)

- Set the [POWER] Switch to [VCR].
- Set [SEARCH] on the [VCR MENU1] Menu to [SCENE].


Scene Index Search in Forward Direction
Press the Index Button [▶] 1 on the Remote Controller.

Scene Index Search in Reverse Direction
Press the Index Button [◀] 2 on the Remote Controller.

- When you briefly press the corresponding button once, the [S1] indication appears and the search for the next scene marked with an index signal starts. After the Scene Index Search has started, every time you press the button, the indication changes successively from [S2] to [S9], and the beginning of the scene corresponding to the selected number is located. 9 After reaching the desired scene, playback starts automatically. (At a time, Scene Index Search in forward or reverse direction is possible up to the ninth scene marked with index signal from the present tape position.)
- If the interval between two scene index signals is less than 1 minute, the Scene Index Search may not work correctly.
- The Scene Index Search may not work correctly for scenes recorded near the beginning of the tape.
- If you keep the [◀] or [▶] Button pressed for more than 2 seconds, the Intro Search Function is activated and it plays back the beginning of all scenes marked with an index signal on the cassette one after another for a few seconds each.
(To cancel the Intro Search Function, press the Play Button [▶] 3 or the Stop Button [■] 5.)

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This function lets you select Automatic Exposure settings optimized for special recording situations.

- [] Sports Mode **1**
To record scenes with fast-moving subjects such as sports scenes.
 - [] Portrait Mode **2**
To make subjects stand out sharply from the background.
 - [] Low Light Mode **3**
To record dark scenes more brightly.
- ## Cancelling the Programme AE Function
- Set the Mode Selector Switch to [AUTO].

Cancelling the Programme AE Function


Set the Mode Selector Switch to [AUTO].

Fading In 1


Fading out ②

- 1 During recording, keep the Fade Button [FADE] pressed.
The picture gradually disappears.
- 2 After the picture has completely disappeared, press the Start/Stop Button to stop recording.
The Movie Camera is in the Recording Pause Mode.
- 3 Release the Fade Button [FADE].

Sports Mode

- When playing back scenes recorded in the Sports Mode, you can enjoy slow motion and still playback of very sharp images with fine details.
- Avoid recording under fluorescent, mercury-vapour or sodium lamps in this mode, as the colour and the brightness of the playback picture might fluctuate.
- When recording subjects lit by strong lights or with much light reflection, the playback picture may contain vertical streaks of light.
- When the scene is not sufficiently lit, the [] indication flashes.


Portrait Mode

- When using this mode for recording indoors, the playback picture may flicker.
- It is not possible to use the Sports Mode [] together with the Gain-up Mode [GAINUP].

Low Light Mode

- It may not be possible to sufficiently brighten up extremely dark scenes.

Sports Mode

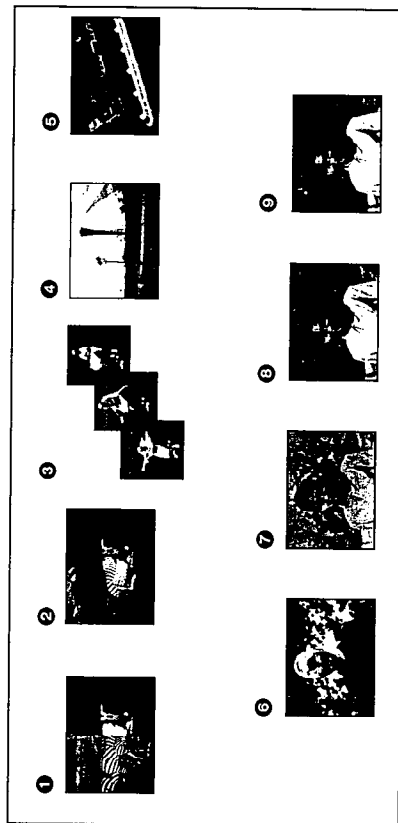
- When playing back scenes recorded in the Sports Mode, you can enjoy slow motion and still playback of very sharp images with the details.
- Avoid recording under fluorescent, mercury-vapour or sodium lamps in this mode, as the colour and brightness of the playback picture might fluctuate.
- When recording subjects lit by strong lights or with much light reflection, the playback picture may contain vertical streaks of light.
- When the scene is not sufficiently lit, the [] indication flashes.

- When the scene is not sufficiently lit, the [] Indication flashes.

Low Light Mode

- It may not be possible to sufficiently brighten up extremely dark scenes.

1-11



Recording with Special Effects (Digital Effects)

There are 9 different modes available for adding special digital picture effects.

Digital Effects 1 [EFFECT1]

- Wipe Mode [WIPE]**
It gradually replaces a picture of the last previously recorded scene with the picture of the new scene, like drawing a curtain. For details, (→ 78).

Digital Effects 2 [EFFECT2]

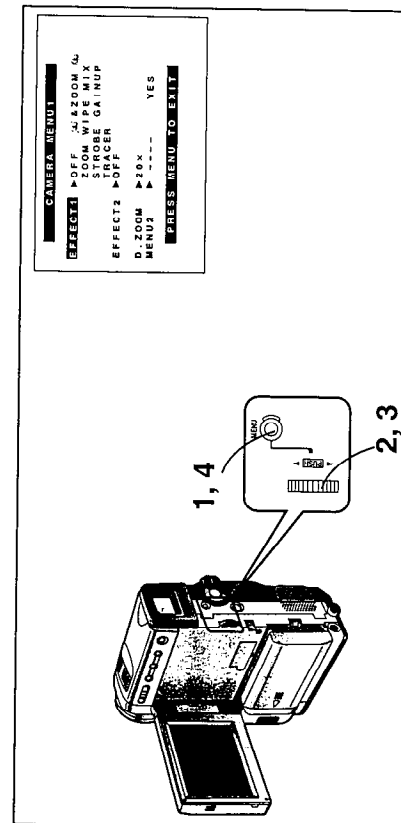
- Mix Mode [MIX]**
It gradually fades out the picture of the last previously recorded scene while fading in the picture of the new scene. For details, (→ 80).
- Strobe Mode [STROBE]**
It records the pictures with a stroboscope-like effect.
- Gain-up Mode [GAIN UP]**
It electronically brightens up the picture. In this mode, adjust the focus manually.

- Trailing Effect Mode [TRACER]**
The picture is recorded with a trailing effect. If you record in the Continuous Photoshot Mode (→ 40), only the first still picture has this effect.

Digital Effects 2 [EFFECT2]

- Negative/Positive Mode [NEGA]**
The recorded pictures have reversed colours similar to photographic negatives.
- Sepia Mode [SEPIA]**
Scenes are recorded with a brown tint similar to the colour of old photographs.
- Black & White Mode [B&W]**
The picture is recorded in black and white.
- Solarisation Mode [SOLARI]**
The picture is recorded with an effect similar to a painting.

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Recording with Special Effects (Digital Effects) (Continued)

Wipe Mode

It gradually replaces a still picture of the last recorded scene with the moving picture of the new scene, like drawing a curtain.

- Press the [MENU] Button.
The [CAMERA MENU1] Menu appears.
- Turn the [PUSH] Dial to select [EFFECT1].
- Press the [PUSH] Dial to select [WIPE].

- Press the [MENU] Button to exit the Menu.
The [WIPE] Indication appears.
- Press the Start/Stop Button to start recording.
The normal recording starts.
- Press the Start/Stop Button to pause recording.
The last picture is stored in memory. The [WIPE] Indication changes to [WIPE].
- Press the Start/Stop Button to start recording again.
The last picture of the previous scene is gradually replaced by the new scene.

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Recording with Special Effects (Digital Effects) (Continued)

Selecting the Desired Digital Effect

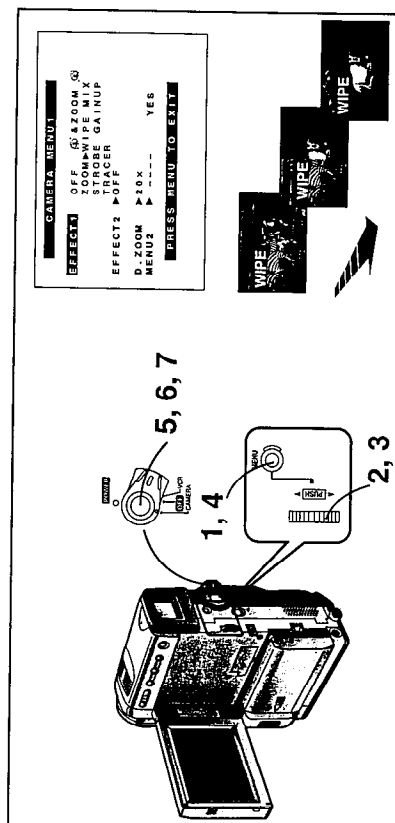
- Press the [MENU] Button.
The [CAMERA MENU1] Menu appears.
- Turn the [PUSH] Dial to select [EFFECT1] or [EFFECT2].
- Press the [PUSH] Dial to select the desired digital effect.
- Press the [MENU] Button to exit the Menu.
The picture now has the selected digital effect. However, the effect of the Wipe Function and the Mix Function only become visible when actually recording in the respective mode. (→ 78, 80)

- If you have set [EFFECT1] on the [CAMERA MENU1] Menu to [GAINUP], you need to adjust the focus manually; however, adjusting the shutter speed and selecting a white balance mode are not possible.
- If you have set [EFFECT2] on the [CAMERA MENU1] Menu to [B&W] or [SEPIA], changing the selected white balance mode is not possible.
- It is not possible to use the Sports Mode [S&L] or the Portrait Mode [P&L] together with the Gain-up Mode [GAINUP].

Cancelling the Digital Effect

Set [EFFECT1] or [EFFECT2] on the [CAMERA MENU1] Menu to [OFF].

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Recording with Natural Colours (White Balance)

This Movie Camera automatically adjusts the white balance to ensure that the pictures are recorded with natural colours. For certain types of subjects and lighting conditions, however, this Auto White Balance Adjustment Mode may not be able to ensure natural colours (→ 164, 166). In these cases, you can select either one of the 3 preset modes explained below (indoor, outdoor, or the last manually adjusted white balance setting), or you can manually adjust the white balance (→ 84).

- 1 Set the Mode Selector Switch to [MNL].
The [MNL] indication appears.
- 2 Press the White Balance [W.B] Button.
Repeatedly press the [W.B] Button to select the desired White Balance Mode.

The modes change in the following order:

- 1 Indoor Mode
(recording under incandescent lamp) (☼)

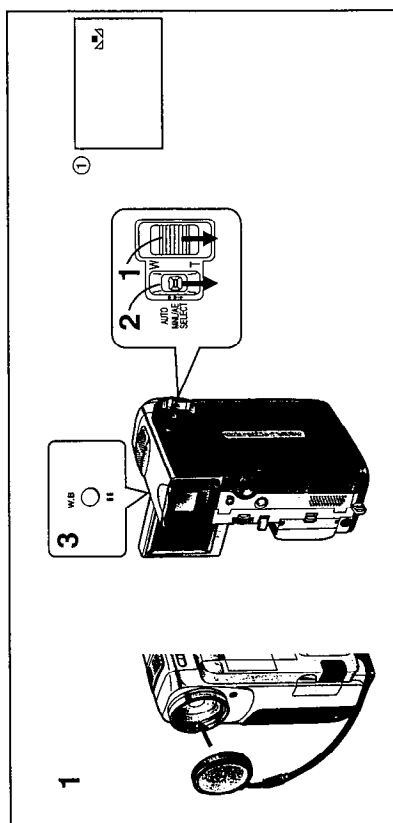
- 2 Outdoor Mode (☼)
- 3 Last manually adjusted White Balance setting (☼) (→ 84)
- 4 Automatic White Balance Adjustment (no indication)

- If you have set [EFFECT1] on the [CAMERA MENU1] Menu to [GAINUP] or you have set [EFFECT2] to [SEPIA] or [BW], it is not possible to change the white balance mode.
- To change the white balance mode, the Movie Camera must be set within the optical zoom range (1× – 10×). If you try to change it in the digital zoom range, the [☼] Indication flashes.

Returning to the Auto White Balance Adjustment Mode

Press the [W.B] Button repeatedly until none of the White Balance Mode Indications (☼, ☼, ☼, ☼) are displayed any more. Or, set the Mode Selector Switch to [AUTO].

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Adjusting the White Balance Manually

Use the Manual White Balance Adjustment Mode for all types of lighting outside the range ① (→ 166), as the Auto White Balance Adjustment Mode can only ensure natural colours for the types of lighting within that range. For optimum results under almost any type of lighting, we recommend that you adjust the white balance manually for each new scene.

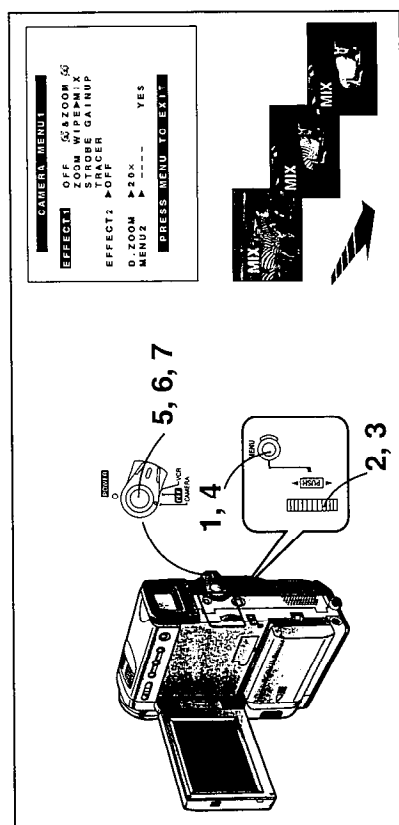
- 1 Attach the Lens Cap and zoom in until the entire screen becomes white.
- 2 Set the Mode Selector Switch to [MNL].
The [MNL] Indication appears.
- 3 Keep the [W.B] Button pressed until the [☼] Indication ① stops flashing and remains lit.

- The Manual White Balance Adjustment is now finished. If you want to use this setting again later on, for example after having used Automatic White Balance Adjustment, you can recall it by pressing the [W.B] Button 3 times. (In this case, the [☼] Indication flashes.)
- When the [☼] Indication remains flashing under weak illumination, the Manual White Balance Adjustment cannot be set manually.
- If you have set [EFFECT1] on the [CAMERA MENU1] Menu to [GAINUP], or you have set [EFFECT2] to [SEPIA] or [BW], it is not possible to adjust the white balance.
- Adjusting the white balance is only possible when the Movie Camera is set within the optical zoom range (1× – 10×). If you try to adjust it in the digital zoom range, the [☼] Indication flashes.

Returning to the Auto White Balance Adjustment Mode

Press the [W.B] Button repeatedly until none of the White Balance Mode Indications (☼, ☼, ☼, ☼) are displayed any more. Or, set the Mode Selector Switch to [AUTO].

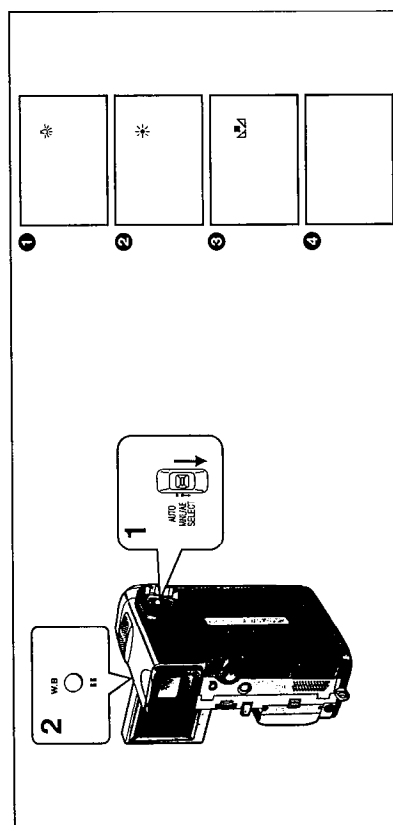
-84-

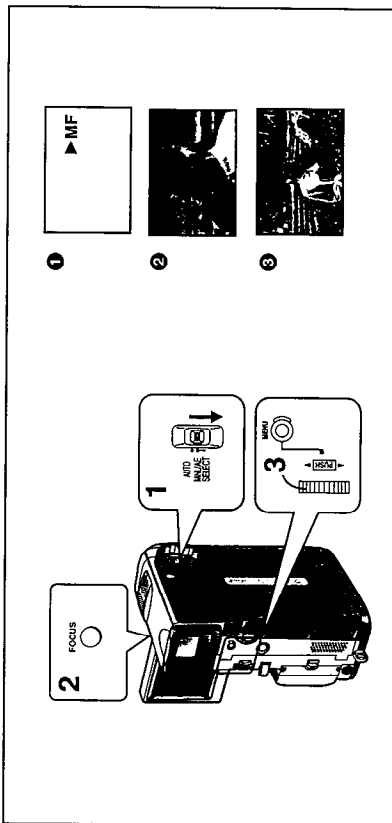


Recording with Special Effects (Digital Effects) (Continued)

- 1 Mix Mode
It gradually fades out a still picture of the last recorded scene while fading in the moving picture of the new scene.
- 1 Press the [MENU] Button.
The [CAMERA MENU1] Menu appears.
- 2 Turn the [PUSH] Dial to select [EFFECT1].
- 3 Press the [PUSH] Dial to select [MIX].
- 4 Press the [MENU] Button to exit the Menu.
The [MIX] Indication appears.
- 5 Press the Start/Stop Button to start recording.
The normal recording starts.
- 6 Press the Start/Stop Button to pause recording.
The last picture is stored in memory.
The [MIX] Indication changes to [MIX].
- 7 Press the Start/Stop Button to start recording again.
The last picture gradually fades out while the new scene fades in.

-80-





Adjusting the Shutter Speed Manually

To achieve special creative effects or to cope with special lighting situations or fast-action scenes, you can adjust the shutter manually.

- 1 Set the Mode Selector Switch to [MNL].
The [MNL] Indication appears.
- 2 Press the [PUSH] Dial.
The Shutter Speed Indication appears.
You can change between the Shutter Speed Indication and the Iris (F Number) (→ 90) Indication by repeatedly pressing the [PUSH] Dial.

-88-

Focusing on the Subject Manually (Manual Focus)

This makes it possible to adjust the focus manually for subjects and recording situations for which automatic focusing is not precise.

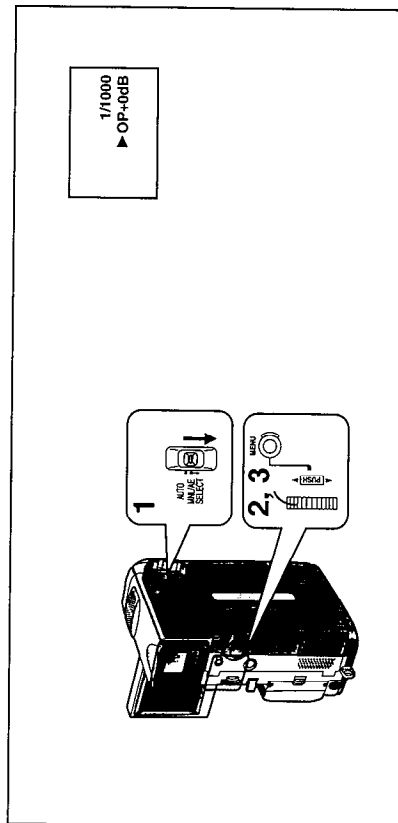
- 1 Set the Mode Selector to [MNL].
The [MNL] Indication appears.
- 2 Press the [FOCUS] Button.
The [MF] Indication ① appears.
MF; Manual Focus Mode
- 3 Turn the [PUSH] Dial until the subject is sharp.

-86-

Returning to the Automatic Focusing Mode
Press the [FOCUS] Button to make the [MF] Indication disappear. Or, set the Mode Selector Switch to [AUTO].

Hint for Manual Focus Adjustment

- If you adjust the focus in the wide-angle setting, the subject may go out of focus when you enlarge it. Therefore, enlarge the subject ② before you adjust the focus, so that the picture remains focused when you zoom out ③.
- If you want to adjust the focus manually after having adjusted the shutter speed (→ 88) or the iris (→ 90), be sure to press the [FOCUS] Button to make the [MF] Indication appear, even if the [MF] Indication is displayed.



Adjusting the Iris (F Number) Manually

To achieve special creative effects or to cope with special lighting situations, you can adjust the iris (F number) manually.

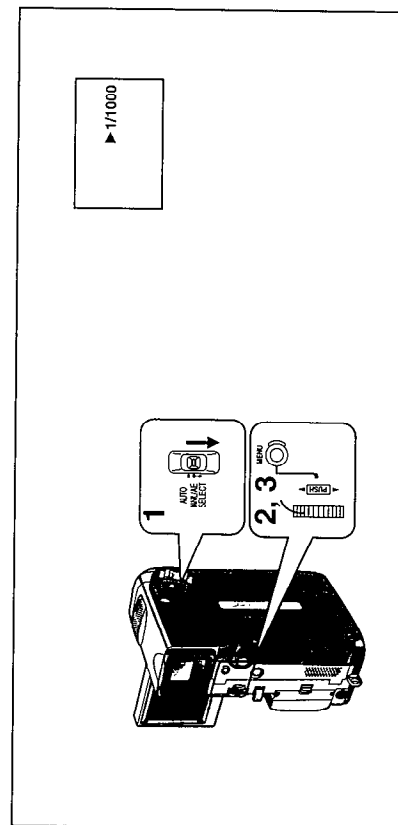
- 1 Set the Mode Selector Switch to [MNL].
The [MNL] Indication appears.
- 2 Press the [PUSH] Dial twice.
The [F] Indication appears.
You can change between the Iris (F Number) Indication and the Shutter Speed Indication by repeatedly pressing the [PUSH] Dial.
- 3 Turn the [PUSH] Dial to adjust the iris.

Range of Iris Adjustment
CLOSE (Closed) → F16...F2.0 → OP (Opened)
+0 dB...OP+18 dB
The nearer to [CLOSE] a value you select, the darker the picture becomes.
The nearer to [OP+18 dB] a value you select, the brighter the picture becomes.
The figures with +dB show the Gain-up value. If you increase the value too much, the picture quality deteriorates.

Returning to the Normal Iris Value (F Number)
Press the [PUSH] Dial one time to make the [F] Indication disappear. Or set the Mode Selector Switch to [AUTO].

- Manually adjusting the shutter speed after performing manual iris adjustment changes the iris back to automatic adjustment. Therefore, if you want to adjust both the shutter speed and iris manually, be sure to adjust the shutter speed first. (→ 88)

-90-



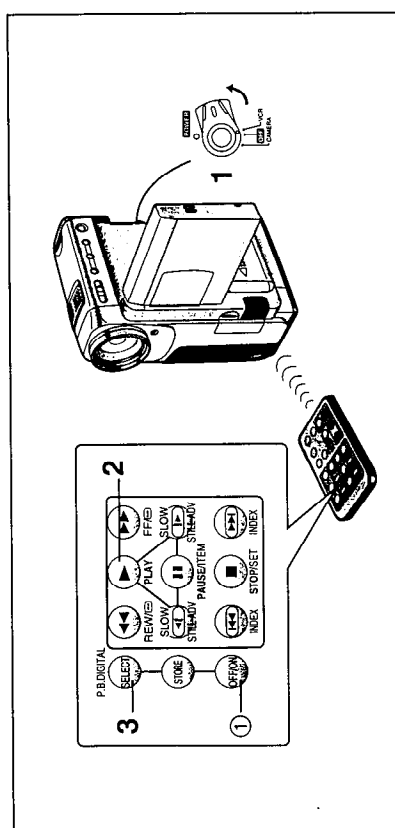
Playing Back with Special Effects (Playback Digital Effects) (Continued)

- **Wipe Function and Mix Function**
After having selected [WIPE] or [MIX] in Step 3 on page 92:
- 1 Press the [▶] Button to start playback.
- 2 Press the [STORE] Button at the moment that you want to store as still image in memory.
The [WIPE] or [MIX] Indication appears and the picture is stored in memory.

- 3 Press the [OFF/ON] Button at the scene at which you want to use a Wipe or Mix effect.
The scenes change with a Wipe or Mix effect.

- Operating the Wipe Function and the Mix Function during playback is only possible with the Remote Controller.
- It is not possible to add a Wipe or Mix effect during playback of an unrecorded part on the tape.
- If you press the [OFF/ON] Button while the Wipe or Mix is being performed, the effect is paused at that point. If you press the [OFF/ON] Button again, the effect resumes.

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Playing Back with Special Effects (Playback Digital Effects)

There are 8 different modes available for adding special digital picture effects to your recordings during playback. They are identical to the Digital Effects 1 and 2 (→ 74) that can be used during recording.

- 1 WIPE
 - 2 MIX
 - 3 STROBE
 - 4 NEGA
 - 5 SEPIA
 - 6 BW
 - 7 TRACER
 - 8 SOLARI
- 1 Set the [POWER] Switch to [VCR].
 - 2 Press the Play Button [▶].
 - 3 Press the [SELECT] Button on the Remote Controller to select the desired digital effect.
Repeatedly pressing the [SELECT] Button changes the selected digital effect in the order 1 to 8.
Selecting a digital effect is also possible by setting [EFFECT SELECT] on the [VCR MENU1] Menu to the desired effect.

-92-

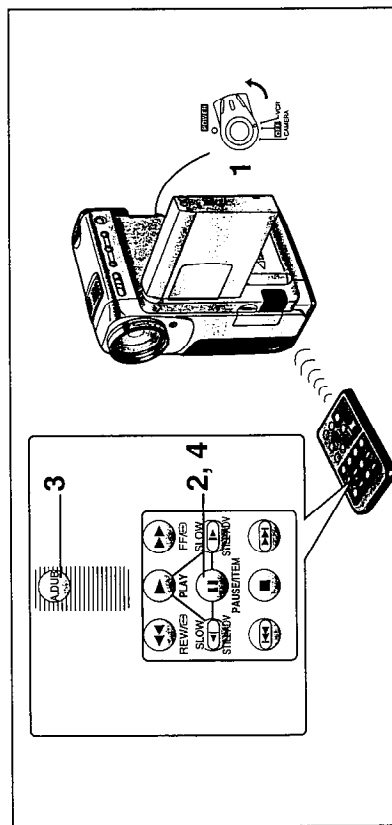
- The signal of the picture with a digital effect added during playback cannot be output from the DV Terminal (→ 10) or the Digital Still Picture Terminal. (→ 126).

Suspending the Playback Digital Effect

Temporarily
You can suspend and re-activate the digital effect by repeatedly pressing the [OFF/ON] Button ①. Suspending the digital effect is also possible by setting [EFFECT] on the [VCR MENU1] Menu to [OFF], and later to [ON] to re-activate it. When the digital effect is temporarily suspended, the indication of the selected effect flashes.

Cancelling the Digital Effect

Set [EFFECT SELECT] on the [VCR MENU1] Menu to [OFF].



Adding New Sound on a Recorded Cassette (Audio Dubbing)

You can add music or narration on a recorded cassette.

- If [AUDIO REC] on the [CAMERA MENU2] Menu has been set to [16bit], performing audio dubbing erases the previously recorded sound. (If you intend to perform audio dubbing but also want to keep the original sound, be sure to set [AUDIO REC] to [12bit] before making the original recording.)
- It is not possible to perform audio dubbing onto recordings made in the LP Mode. (→ 24)

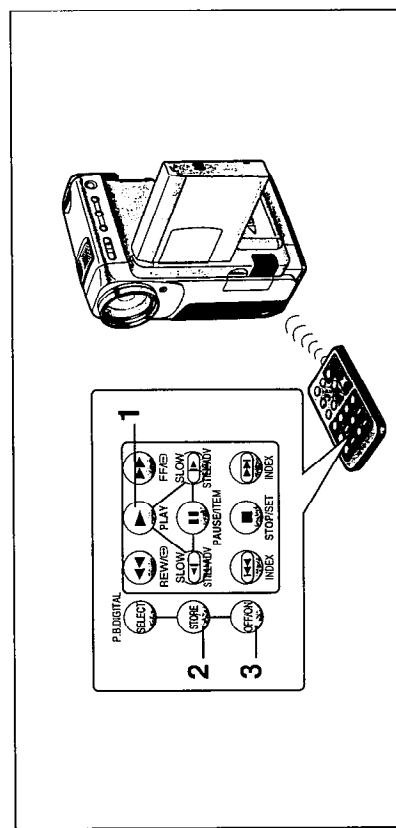
- 1 Insert the recorded cassette and set the [POWER] Switch to [VCR].

- 2 At the point from which you want to insert the new sound, switch the Movie Camera over to the Still Playback Mode.
- 3 Press the [A.DUB] Button on the Remote Controller.
- 4 Press the Pause Button [II] on the Remote Controller to start audio dubbing.

Stopping Audio Dubbing

Press the Pause Button [II] on the Remote Controller. The Movie Camera is again in the Still Playback Mode.

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Playing Back the Sound Recorded with Audio Dubbing

Depending on the setting selected for [12bit AUDIO] on the [VCR MENU1] Menu, the sound added with audio dubbing and the original sound are played back as follows:

- ST1: The original sound alone is played back.
- ST2: The dubbed sound alone is played back.
- MIX: The original sound and the sound added with audio dubbing are played back together.

- Do not perform audio dubbing onto unrecorded parts of the tape. This could cause the playback picture and sound to be distorted.
- If you reset the Tape Counter to zero at the point where you want the audio dubbing to end and turn on the Memory Stop Function (→ 168), the audio dubbing automatically stops when the tape reaches that point.

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Remote Controller

Using the wireless Remote Controller supplied with the Movie Camera allows operating most of the Movie Camera's major functions from a distance.

Buttons on the Remote Controller

- 1 **Indication Output Button [OSD]**
To display the function and operation indications on a connected TV. (→ 54)

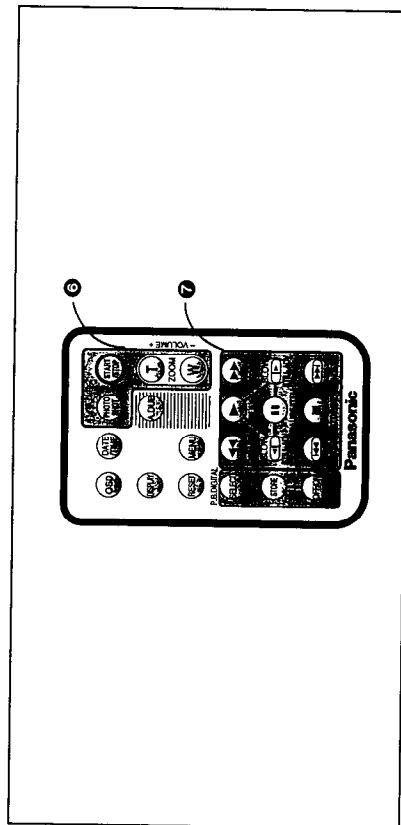
- 2 **Date and Time Button [DATE/TIME]**
To make the Date/Time indication appear or disappear in the picture during recording or playback. (→ 46)

- 3 **Indication Shift Button [DISPLAY]**
To select the desired Counter Indication. (→ 176)

- 4 **Reset Button [RESET]**
To reset the Tape Counter to zero. (→ 168)

- 5 **Audio Dubbing Button [A.DUB]**
To perform audio dubbing. (→ 96)

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Controls for Recording and Sound Volume

- 6 **Photoshot Button [PHOTO SHOT]**
To record still pictures. (→ 40)

- 7 **Recording Start/Stop Button [START/STOP]**
To start and pause recording. (→ 32)

- 8 **Zoom/Sound Volume Buttons [ZOOM/VOLUME]**
CAMERA Mode: To zoom in and out. (→ 38)
VCR Mode: To adjust the volume of the playback sound. (→ 46)

Controls for Playback and Menu Settings

- 9 **Rewind/Review Button [←4]**
To start review playback (→ 48) if pressed during normal playback; and to rewind the tape if pressed in the Stop Mode.

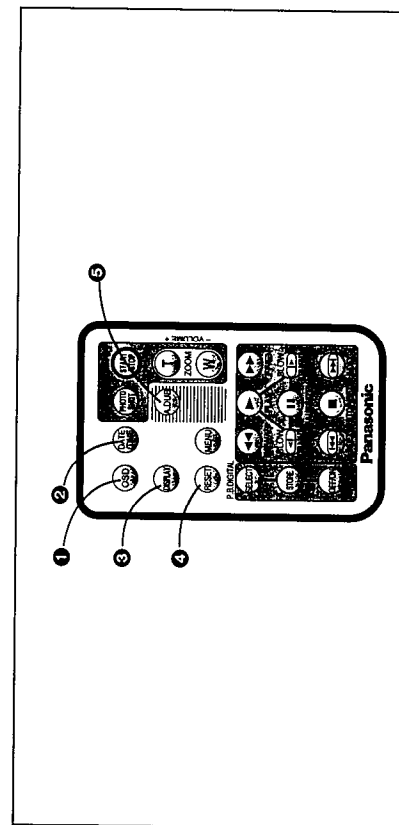
- 10 **Also to activate the Camera Search Function (→ 58)**
Also to activate the Camera Search Function (→ 58) in reverse direction if kept pressed in the Recording Pause Mode. Pressing it briefly activates the Recording Check Function (→ 34).

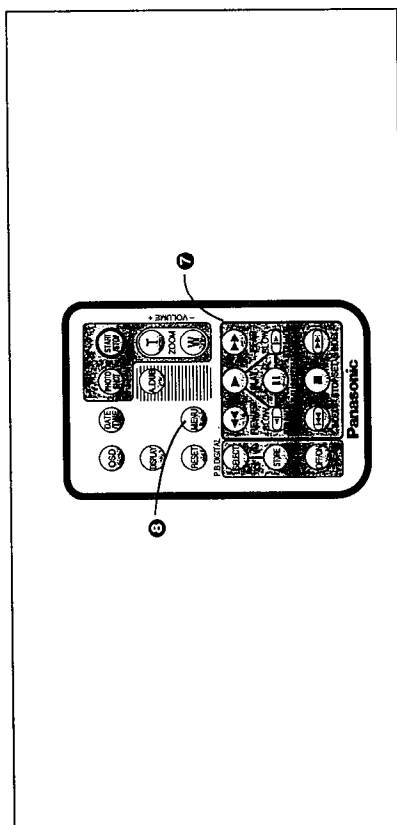
- 11 **Fast-forward/Cue Button [▶▶]**
To start cue playback (→ 48) if pressed during normal playback; and to fast-forward the tape if pressed in the Stop Mode.

- 12 **Also to activate the Camera Search Function (→ 58)**
Also to activate the Camera Search Function (→ 58) in forward direction if kept pressed in the Recording Pause Mode.

- 13 **Play Button [▶]**
To start playback. (→ 46)

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7 Controls for Playback and Menu Setting (Continued)

Slow Motion/Still Advance Button [◀, ▶]
To perform Slow Motion Playback if pressed in the Normal Playback Mode; and to perform Still Advance Playback if pressed in the Still Playback Mode. (→ 50, 52)

Index Search Button [◀◀, ▶▶]
To search for recorded scenes marked with an index signal and for still images recorded in the Photostat Mode. (→ 62, 64, 66)
(◀◀: in reverse direction, ▶▶: in forward direction)

Stop Button [■]
To stop the tape. (→ 46)

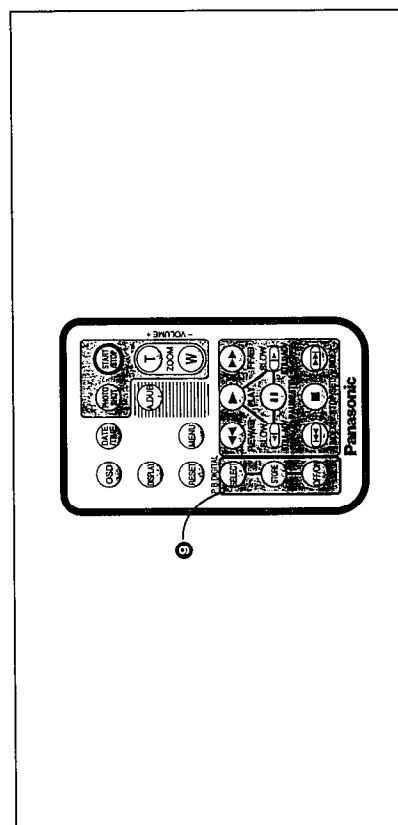
Pause Button [II]
To pause playback. The playback picture stands still. (→ 52, 56)

Menu Button [MENU]
Pressing the Menu Button [MENU] displays the Menu.
In this case, the functions of the following buttons are changed:

Pause Button → Item Button
To select items on the Menu.

Stop Button → Setting Button
To set the mode for the selected item.

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9 Playback Digital Effects

Selection Button [SELECT]

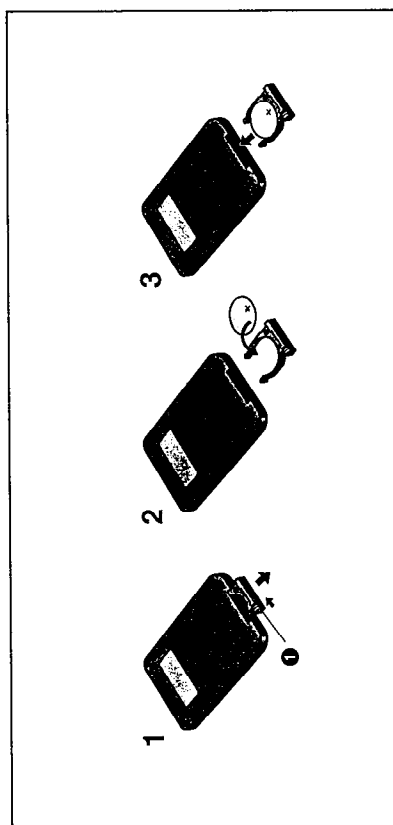
To select the desired digital effect for [EFFECT SELECT] on the [VCR MENU1] Menu. (→ 92)

Store Button [STORE]

To store a still picture in memory for the Wipe or Mix Function. (→ 94)

Off/On Button [OFF/ON]
To suspend the selected digital mode or re-activate it. (→ 92)
To start a Wipe or Mix transition from the still picture stored in memory. (→ 94)

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Remote Controller (Continued)

Inserting the Button-type Battery

Insert the supplied button-type battery before using the Remote Controller.

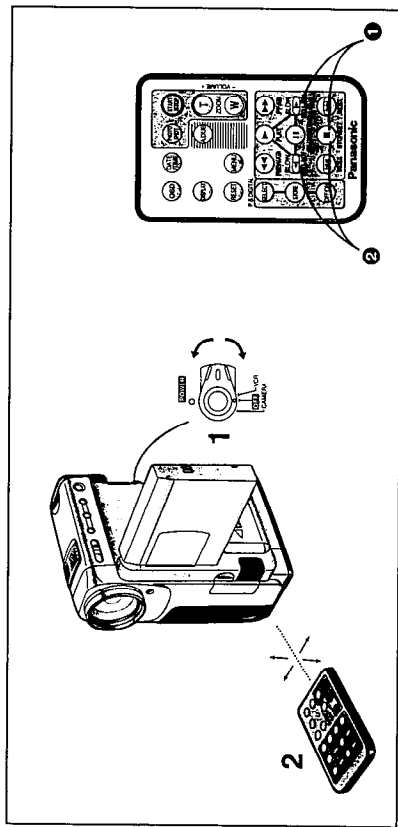
- 1 Pull out the Battery Holder while pressing the Stopper ①
- 2 Insert the button-type battery with the stamped (+) mark facing upward.
- 3 Insert the Battery Holder into the Remote Controller.

- When the button-type battery is exhausted, replace it with a new CR2025 battery.
(The life of the battery is about 1 year. However, it depends on the frequency of use.)
- **Keep the button-type battery out of the reach of children.**
- Make sure you insert the battery with its poles correctly aligned.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the equipment manufacturer.
Discard used batteries according to manufacturer's instructions.

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■ Using the Remote Controller

- 1 Set the [POWER] Switch to [CAMERA] or [VCR].

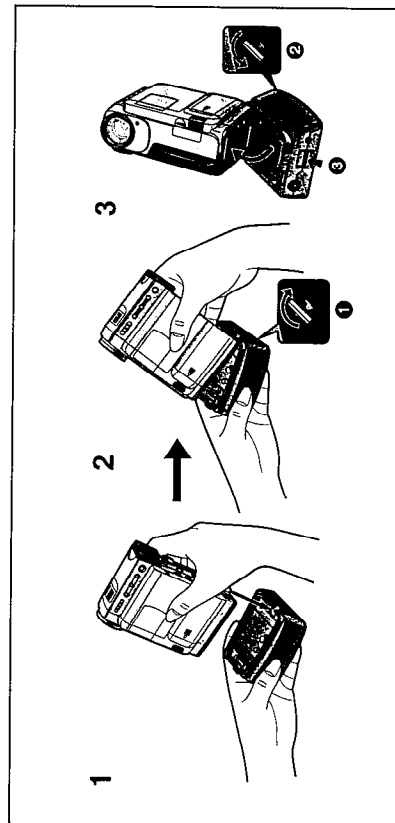
When you want to perform recording operations, set the switch to [CAMERA], and when you want to perform playback operations, set it to [VCR].

- 2 Aim the Remote Controller at the Remote Control Sensor on the Movie Camera and press the appropriate button.

Distance to the Movie Camera: Less than 5 metres.
Angle: Approximately 15° up, down, left and right from centre axis.

- The operative range described above is valid for using the Remote Controller indoors.
- When using it outdoors or under strong lights, it may not work correctly even within the above range.
- Within a distance of about 1 metre, it is also possible to use the Remote Controller from the side (LCD Monitor side).

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Using the Output Terminal Box [AV ONE TOUCH STATION]

When you want to connect the Movie Camera to a TV for playback or to other video equipment for editing and other purposes, attach the Output Terminal Box [AV ONE TOUCH STATION].

Attaching the Output Terminal Box [AV ONE TOUCH STATION]

- 1 Attach the Movie Camera to the Output Terminal Box [AV ONE TOUCH STATION] as shown above.

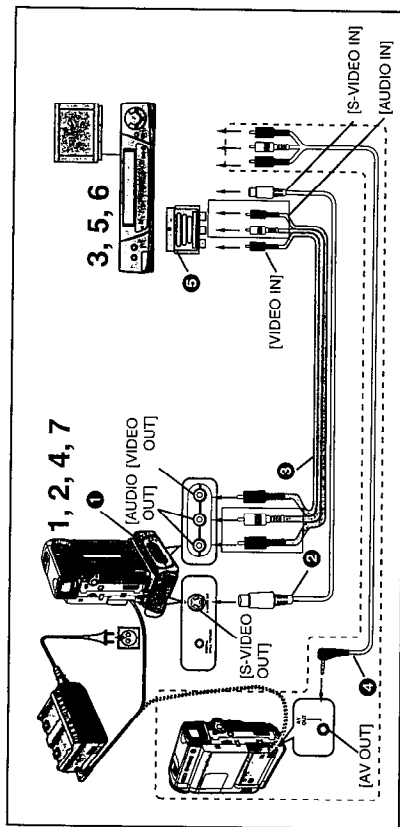
- 2 Fasten the locking screw ① to attach the Output Terminal Box securely.

Removing the Output Terminal Box [AV ONE TOUCH STATION]

- 3 Loosen the locking screw ② and remove the Output Terminal Box while pressing the [PUSH RELEASE] Button ③.

Hold both the Movie Camera and the Output Terminal Box firmly to prevent them from dropping.

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Copying onto an S-VHS (or VHS) Cassette (Dubbing)

You can copy the picture and sound recorded on this Movie Camera onto an S-VHS or VHS cassette in a home video recorder.

After making the connections shown above, perform the necessary operations.

- Before copying, be sure to press the [OSD] Button on the Remote Controller (→ 100) so that no indications are visible. Otherwise the displayed tape counter and function indications are also copied.

Movie Camera:

- 1 Set the [POWER] Switch to [VCR].
- 2 Insert the recorded cassette.

VCR:

- 3 Insert an unrecorded cassette with intact erasure prevention tab.

As some settings (external input, tape speed, etc.) on the VCR are necessary, please refer to your VCR's operating instructions.

Movie Camera:

- 4 Press the Play Button [▶] to start playback.

VCR:

- 5 Start recording.

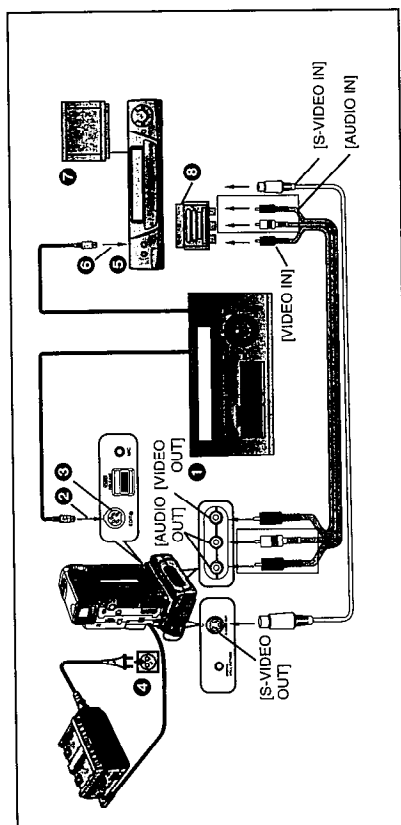
- 6 Press the Pause or Stop Button to stop recording.

Movie Camera:

- 7 Press the Stop Button [■] to stop playback.

- ① Output Terminal Box [AV ONE TOUCH STATION]
- ② S-Video Cable
- ③ AV Cable (PHONO-PHONO)
- ④ AV Cable (PHONO-M3)
- ⑤ 21-Pin Adaptor

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Copying with the Help of an Editing Controller

If you connect the Movie Camera to an Editing Controller equipped with 5-pin Edit Socket, this Movie Camera's playback functions can be controlled from the Editing Controller.
(The Output Terminal Box [AV ONE TOUCH STATION] is necessary.)

After connecting all equipment as shown above, perform the necessary operations.

When Connecting the Editing Controller VW-EC500E (1) (optional)

- A VCR equipped with 5-pin Edit Socket is necessary.
- When you connect the VW-EC500E to the Movie Camera, an adjustment on the VW-EC500E is necessary. For the operation of the Editing Controller, refer to its operating instructions.

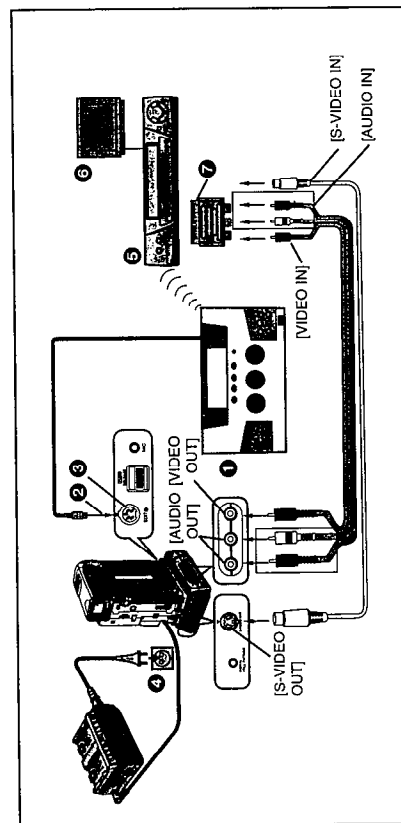
When Editing with Time Code

Press the [DISPLAY] Button on the Remote Controller to make the Time Code appear.

- When the Time Code is displayed, the Time Code Signal is output from the Edit Socket.
- When the Counter Indication is displayed, the Linear Tape Counter Signal is output.

- 2 To Edit Socket
- 3 Edit Socket
- 4 Connect the AC Adaptor.
- 5 VCR (not supplied)
- 6 To Edit Socket
- 7 TV (not supplied)
- 8 21-Pin Adaptor

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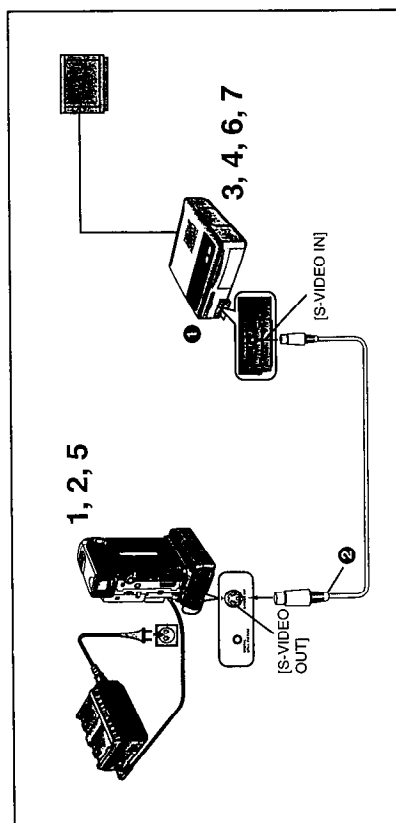


When Connecting the Editing Controller VW-EC1E (optional)

- When you use the Editing Controller VW-EC1E (1), it is not necessary to connect it to the Edit Socket on the VCR, as the VCR's operation is performed via infrared remote control. Therefore, editing is also possible onto VCRs not equipped with an Edit Socket.
- For the operation of the Editing Controller, refer to its operating instructions.

- 2 To Edit Socket
- 3 Edit Socket
- 4 Connect the AC Adaptor.
- 5 VCR (not supplied)
- 6 TV (not supplied)
- 7 21-pin Adaptor

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Using the Movie Camera with a Video Printer

If you connect the Movie Camera to a Video Printer (1), you can print still pictures from scenes recorded with the Movie Camera.

Movie Camera:

- 1 Set the [POWER] Switch to [VCR].
 - 2 Insert a recorded cassette.
- Video Printer:
- 3 Turn the Video Printer on.

- 4 If the Video Printer is equipped with Digital Image Stabilizer Function and/or Moving/Still Picture Mode, adjust them according to the picture being input.

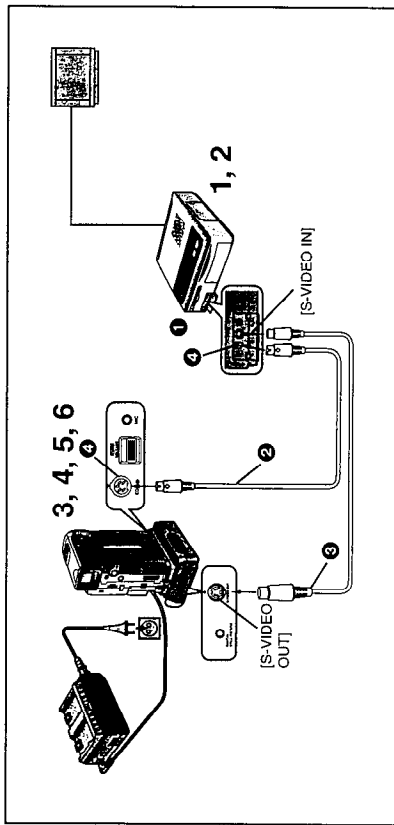
Movie Camera:

- 5 Press the Play Button [▶].
- Video Printer:
- 6 Store the image in memory.
 - 7 Start printing.

For details about the operation of the Video Printer, read its operating instructions.

- 8 S-Video Cable

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Using the Automatic Printing Function (Autoprint)

If you connect the Movie Camera to a Video Printer equipped with 5-pin Edit Socket, you can use the Autoprint Function to automatically print all still pictures recorded in the Photoshot Mode.

Video Printer:

- 1 Turn the Video Printer on.
- 2 Make the necessary settings on the Video Printer according to the input signal.

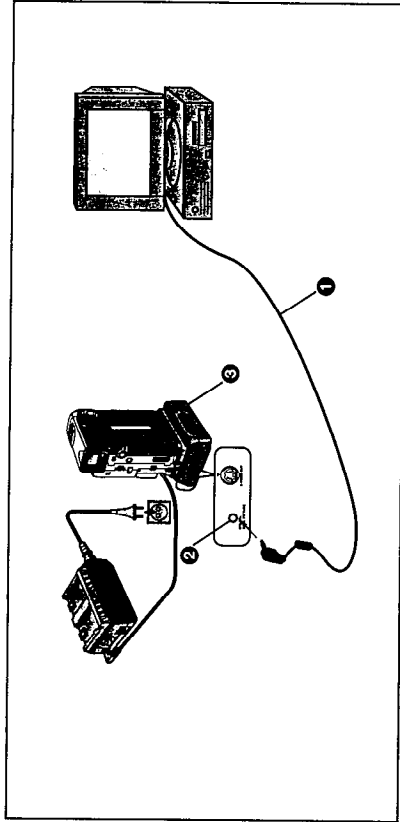
Movie Camera:

- 3 Set the [POWER] Switch to [VCR].

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- When the cooling function of the Video Printer activates and the printing speed slows down, automatic printing may stop. In this case, set [AUTOPRINT] on the [VCR MENU2] Menu to [ON] again.
- If you replace the ink cassette or paper during printing, the same picture may be printed twice.
- If still pictures are recorded successively in the Photoshot Mode, some pictures may be skipped during printing.
- Before storing an image in memory on the Video Printer, press the [OSD] Button (→ 100) on the Remote Controller of the Movie Camera so that no indications appear in the picture. Otherwise, the Counter Indication and other function indications are also printed in the picture.

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Using the Movie Camera with a Computer

The Personal Computer Connection Kit VW-DTAT1E (optional) for Digital Video Cameras makes it possible to connect the Movie Camera to a computer and transmit still video images to it. (The Output Terminal Box [AV ONE TOUCH STATION] is also necessary.)

Computer System Requirements

DV STUDIO can be installed in a PC/AT personal computer which can run Microsoft Windows® 95.

Compatible machines: Personal computer with 80486DX4 or higher CPU (Pentium™ or higher recommended)

Graphic card: True Color (approx. 16.7 million colours) recommended (operation also possible even with 256 colours)

Installed memory: 16 MB or more (32 MB or more recommended)

Free hard disk space: At least 10 MB

Disk drive: CD-ROM drive

Serial port: RS-232C (D-sub 9pin)

Other requirements: Mouse

To connect the Movie Camera to the computer, use the special Interface Adapter ① contained in the Personal Computer Connection Kit.

- When using the Personal Computer Connection Kit, the [POWER] Switch on the Movie Camera must be set to [VCR].
- Pictures that you intend to import into computer applications should be recorded in the SP Mode.
- When recording, take care that the Time Code is uninterrupted from the beginning of the tape.
- Windows® 95 is a trademark of Microsoft Corporation U.S.A.
- All other company and product names in the operating instructions are trademarks of their respective corporations.

② Digital Still Picture Terminal

③ Output Terminal Box [AV ONE TOUCH STATION]

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VCR Mode Menu [VCR MENU1]

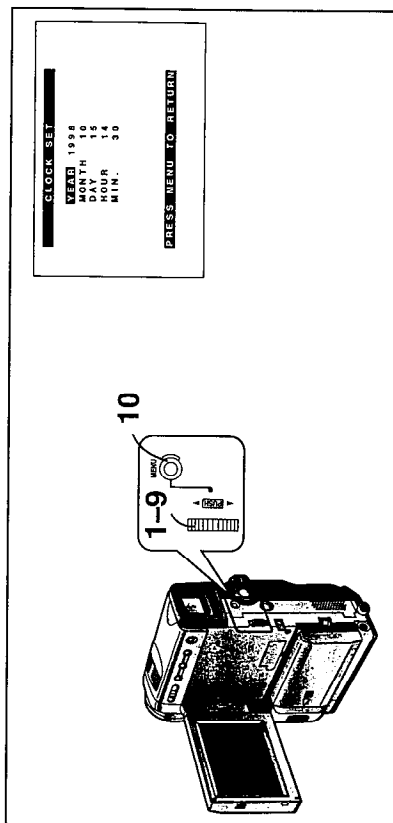
- 1 Digital Effect On/Off [EFFECT] (→ 92)
 - 2 Digital Effect Selection [EFFECT SELECT] (→ 92)
 - 3 Index Search Mode [SEARCH] (→ 62, 64, 66)
 - 4 Blank Search [BLANK SEARCH] (→ 60)
 - 5 Audio Output Mode [12bit AUDIO] (→ 98)
 - 6 Advancing to Menu 2 [MENU2]
- If you set [MENU2] to [YES], the Menu changes to the [VCR MENU2] Menu.

[VCR MENU2]

- 7 Automatic Printing [AUTOPRINT] (→ 122)
 - 8 Returning to the Previous Menu [RETURN]
- If you set [RETURN] to [YES], the Menu changes back to the [VCR MENU1] Menu.

• All other items on the VCR Mode Menu are the same as on the Camera Mode Menu.

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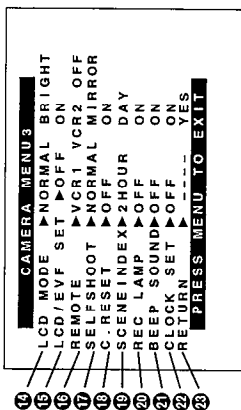
Setting the Date and Time

If you set [CLOCK SET] either on the [CAMERA MENU3] Menu or [VCR MENU2] Menu to [ON], the Menu shown above appears.

For example: To set the clock to 15th October 1998, 14:30.

- 1 Turn the [PUSH] Dial to set to [1998].
The years change in the following order:
1980→1991→...→2089→1990→...
- 2 Press the [PUSH] Dial to select [MONTH].
- 3 Turn the [PUSH] Dial to set to [10].
- 4 Press the [PUSH] Dial to select [DAY].
- 5 Turn the [PUSH] Dial to set to [15].
- 6 Press the [PUSH] Dial to select [HOUR].
- 7 Turn the [PUSH] Dial to set to [14].
- 8 Press the [PUSH] Dial to select [MIN.].
- 9 Turn the [PUSH] Dial to set to [30].
- 10 Press the [MENU] Button to finish the date and time setting.
The operation of the clock starts from [00] seconds.

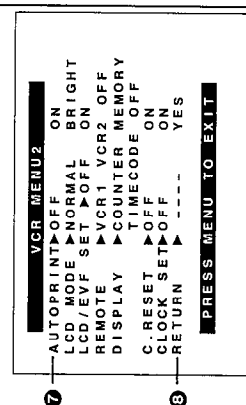
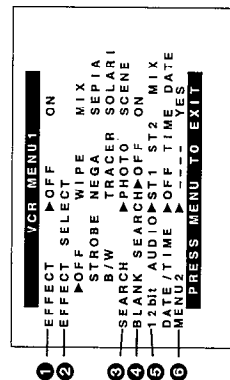
-138-



Camera Mode Menu (Continued) [CAMERA MENU3]

- 16 LCD Lighting Mode [LCD MODE] (→ 142)
 - 17 LCD and Finder Adjustment [LCD/EVF SET] (→ 142)
 - 18 Remote Controller Mode [REMOTE] (→ 110)
 - 19 Self-Recording [SELF SHOOT] (→ 36)
 - 20 Counter Reset [C-RESET] (→ 168)
To reset the counter to zero.
However, the Time Code cannot be reset.
 - 21 Scene Index Mode [SCENE INDEX] (→ 66)
 - 22 Recording Lamp [REC LAMP] (→ 32)
 - 23 Beep Sound [BEEP SOUND]
- If you set [BEEP SOUND] to [ON], a confirmation/ alarm beep sound is emitted in the following cases:
- When you turn on the Movie Camera.
 - When you start recording and pause recording.
 - When the tape reaches its end and you try to start recording.
 - When you try to start recording without having inserted a cassette.
 - When you insert a cassette with its erasure prevention slider set to [SAVE] and try to start recording.
 - When condensation has formed inside the Movie Camera.

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Adjusting the Brightness and Colour Level of the LCD Monitor/Finder

If you set [LCD/EVF SET] on the [CAMERA MENU3] Menu or [VCR MENU2] Menu to [ON], the following items are displayed:

LCD Brightness [LCD BRIGHTNESS]

To adjust the brightness of the picture on the LCD screen.

LCD Colour Level [LCD COLOUR LEVEL]

To adjust the colour saturation of the picture on the LCD screen.

Finder Brightness [EVF BRIGHTNESS]

To adjust the brightness of the picture in the Finder.

1 Press the [PUSH] Dial to select the item that you want to adjust.

2 Turn the [PUSH] Dial to increase or decrease the vertical bars of the Bar Indication.

The Bar Indication is divided into 8 steps. The more vertical bars are shown, the stronger is the brightness or colour saturation.

If you use the Remote Controller for this adjustment, press the [ITEM] Button and then adjust the brightness or colour saturation by pressing the [SET] Button. The number of the bars gradually increases toward the right end, and then it decreases again.

Increasing the Brightness of the LCD Monitor's Backlighting

Set [LCD MODE] either on the [CAMERA MENU3] Menu or [VCR MENU2] Menu to [BRIGHT].

- All adjustments explained on this page have no influence on the actually recorded picture.

-142-

Cautions for Use

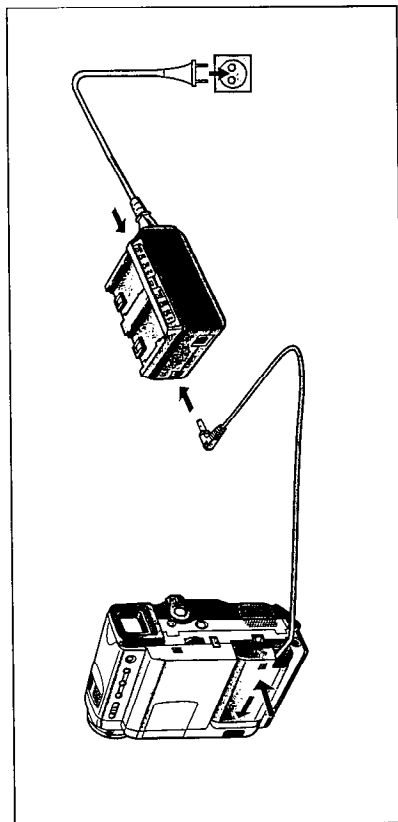
Take care that no water enters the Movie Camera when using it in the rain and snow or on the beach.

- The Movie Camera and the cassette could become damaged. (It might not be repairable.)

Keep the Movie Camera away from magnetized equipment (TVs, Video games, etc.).

- If you use the Movie Camera on or near a TV, the electromagnetic radiation may cause picture and sound distortion.
- Strong magnetic fields generated by speakers and large motors may damage the recordings on the tape and distort the picture.
- The electromagnetic radiation from microprocessors can adversely influence the Movie Camera and cause picture and sound distortion.
- If the Movie Camera is adversely influenced by magnetized equipment and does not work correctly, turn the Movie Camera off, remove the Battery or disconnect the AC Adaptor and attach the Battery or connect the AC Adaptor again. Then turn the Movie Camera on.

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Charging the Built-in Lithium Battery

The built-in battery maintains the operation of the clock. When the [B] Indication appears, the built-in lithium battery is discharged. Charge the discharged battery in the following way and after charging is finished, set the date and time.

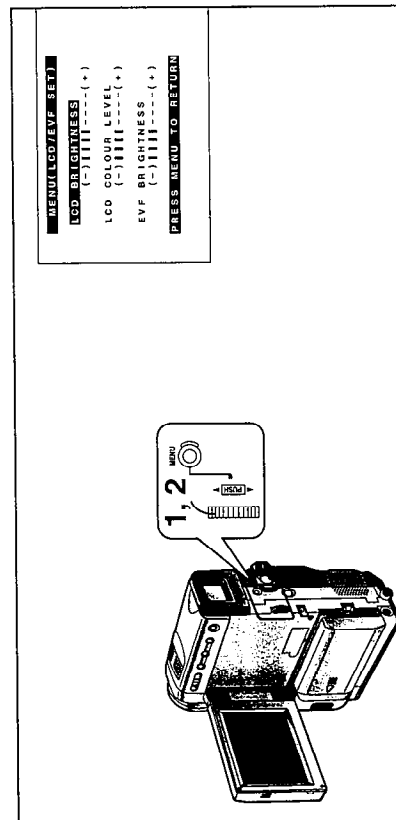
2 Leave the Movie Camera turned off.

3 Leave the Movie Camera in this condition for approximately 4 hours.

After charging for 4 hours, the built-in lithium battery can power the clock for approximately 3 months.

1 Connect the AC Adaptor to the Movie Camera and to an AC mains socket.
(→ 16)

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Do not spray insecticide or volatile agents on the Movie Camera.

- Such agents could deform the body and cause the surface coating to peel off.
- Do not leave the Movie Camera in direct contact with rubber or plastic products for a long time.

Do not use benzine or thinner for cleaning.

- They could deform the body and cause the surface coating to peel off.
- Before cleaning, remove the Battery or unplug the AC Mains Cable from the AC mains socket.
- Wipe the Movie Camera with a soft, clean cloth. To remove persistent stains, wipe with a cloth moistened with mild detergent diluted with water, and then finish with a dry cloth.

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After use, always take out the cassette and remove the Battery or unplug the AC Mains Cable from the AC mains socket.

- If you leave the cassette in the Movie Camera, the tape can become loosened and damaged.
- If you leave the Battery attached to the Movie Camera for a long time, the voltage level may drop excessively so that the Battery cannot be used any more even after charging.

■ Video Head Clogging and Remedy

When the video heads (which contact the tape) are dirty, the playback picture contains mosaic-like patterns or the whole screen becomes black. If they become even more dirty, the recording performance deteriorates and in the worst case, recording may not be possible at all.

Causes of Dirty Video Heads

- A lot of dust in the air
- High-temperature and high-humidity environment
- Damaged tape
- Long-time use

Using the Mini-DV Format Digital Video Head Cleaner (not supplied)

- 1 Insert the Head Cleaner into the Movie Camera in the same way as a video cassette.
- 2 Press the Play Button [▶], and after approximately 20 seconds press the Stop Button [■]. (Do not rewind the tape.)
- 3 Take out the Head Cleaner. Insert a video cassette, perform recording and then play it back to check the picture.
- 4 If the picture is still not clear, repeat above operation steps 1 - 3. (Do not use the Head Cleaner more than 3 times in succession.)

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■ Condensation

Determining Whether Condensation Has Formed Inside and Remedy for Condensation

If the Condensation Indication flashes after you turn on the Movie Camera, condensation has formed inside the Movie Camera. In this case, the Movie Camera automatically switches off after a few seconds. Remedy as follows:

1

Take out the cassette.

All other functions do not work. Depending on the amount of condensation, it may not be possible to take out the cassette. In this case, wait 2-3 hours before taking out the cassette.

2

Leave the Cassette Compartment open

and wait for 2-3 hours.

The required time depends on the amount of condensation and the ambient temperature.

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■ Optimum Use of the Battery

Special Characteristics of the Battery

This Battery is a rechargeable lithium-ion battery. Its ability to generate electric energy is based on an internal chemical reaction. This reaction is easily influenced by ambient temperature and humidity, and the useful operation time that the Battery can provide becomes shorter at high and low temperatures. When used in extremely cold surroundings, the Battery may only be able to provide approximately 5 minutes of operation time. If the Battery becomes extremely hot, a protection function is activated and prevents the use of the Battery for some time.

After Use, Always Remove the Battery.

Be sure to remove the Battery from the Movie Camera. (If it is attached to the Movie Camera, a small amount of electric current is consumed even if the Movie Camera is turned off.) Leaving the Battery attached to the Movie Camera for a very long time could cause it to become excessively discharged, so that it cannot be used any more even after charging.

Keep the Battery's Terminals Clean.

Be careful that the terminals do not get plugged up with dust, dirt or other substances. If you accidentally drop the Battery, confirm that the Battery itself and the terminals are not deformed. Attaching a deformed Battery to the Movie Camera or to the AC Adaptor could damage the Movie Camera or the AC Adaptor.

Notes:

- Do not rewind the tape in the Head Cleaner after every use. Rewind it only after the tape has reached its end, and then use it again in the same way from the beginning.
- If the video heads again become clogged with dirt soon after cleaning, this might be caused by a damaged tape. In this case, stop using that cassette immediately.
- Be careful not to clean the video heads too much. (Too much cleaning could cause excessive wear to the video heads. If the video heads get worn, the picture is not played back clearly even after cleaning.)
- If using the Head Cleaner does not clear the video head clogging, the Movie Camera requires cleaning or repairing by a service centre.
- Please consult with your dealer.
- This Video Head Cleaner is available from Panasonic service centres.

Periodic Inspection

To ensure optimum picture quality, we recommend that you have worn-out parts such as video heads replaced after approximately 1000 hours of use. However, this depends considerably on the conditions of use such as temperature, humidity and dust.)

Discarding a Battery That Has Become Unusable

- The usable life of the Battery is limited.
- Do not throw the Battery in a fire because it could explode.

■ When the Charge Lamps on the AC Adaptor Flash as Warning

If the ambient temperature is extremely low or high, the Charge Lamps on the AC Adaptor flash. They also flash when some defect has occurred in the Battery or the AC Adaptor.

When the Charge Lamps Flash Slowly

The Battery is being charged, but charging takes longer than normally.

When Only the [80%] Charge Lamp Flashes

Charging is not possible. Remove the Battery once and wait a few minutes, and then re-attach it again for charging.

When the [50%] and [100%] Charge Lamps Flash Alternately, or When No Charge Lamps Light

Remove and then re-attach the Battery. Or, attach the Battery to the Movie Camera and perform playback (or some other operation) for 10 - 20 minutes. Then remove the Battery and attach it again to the AC Adaptor. If charging is still impossible, some malfunction has occurred in the Battery or the AC Adaptor. Please consult with your dealer.

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■ Precautions for Storage

Before Storing the Movie Camera, Take out the Cassette and Remove the Battery.

Store all equipment in a dry place where the temperature remains relatively constant. (Recommended temperature is 15°C–25°C and recommended relative humidity is 40%–60%.)

Movie Camera

- Wrap it with a soft cloth to prevent dust from entering.

Battery

- Extremely low or high temperature shortens the battery life.
- Storing it in places with oily smoke and a lot of dust could cause the terminals to get rusty, and this can result in malfunction.
- Do not allow metal objects (such as necklaces and hair pins) to touch the battery terminals. Short-circuiting may occur and generate heat, and touching it in this condition could inflict serious burns.
- Store the Battery in discharged condition. If you store the Battery for a long time, we recommend that you charge it once a year and completely use up the charge before storing it again in discharged condition.

Cassette

- Rewind the tape to its beginning before storing. Leaving the cassette with the tape stopped halfway for more than 6 months (depending on the storing condition) loosens the tape. Be sure to rewind it to the beginning.
- Put the cassette in its case to store it. Dust, direct sunlight (ultraviolet rays) and humidity could damage the tape. Dust contains hard mineral particles and cassettes with dust damage the video heads and other parts of the Movie Camera. Make it a habit to always put the cassette back into its case.
- Completely wind the tape forward and then rewind it once every half year. Leaving the cassette for more than a year without winding/rewinding may deform the cassette because of stretching and shrinking of the tape due to changes in temperature and humidity. Also, the tape may stick together.
- Do not place the cassette near strongly magnetized objects or equipment.
- The tape surface is coated with microscopic magnetic particles and they record signals. Such objects as magnetic necklaces and toys have stronger magnetic force than commonly thought, and this could erase the recorded contents and cause noise in picture and sound.

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■ LCD Monitor/Finder/MC Protector/

Microphone Socket

LCD Monitor

- In places where big changes in temperature occur, condensation may form on the LCD Monitor. Wipe it with a soft, dry cloth.
- If the Movie Camera is very cold when it is turned on, the picture on the LCD Monitor is initially a little darker than normally. However, as the internal temperature rises, the LCD Monitor regains its normal brightness.
- Extremely high precision technology is employed in producing the LCD Monitor. The result is more than 99.99% effective pixels with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

Finder

- Extremely high precision technology is employed in producing the Finder screen. The result is more than 99.99% active pixels, with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.
- Do not leave the Finder or the Lens aimed at the sun. This could seriously damage internal parts.

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Glossary

■ Digital Video System

In the digital video system, picture and sound are converted into digital signals and recorded onto the tape.

This completely digital recording allows recording and playback of picture and sound with minimum quality deterioration.

In addition, such data as Time Code, Date and Time are also automatically recorded as digital signals.

Features

- Superior picture resolution
- Excellent signal-to-noise ratio
- Stable pictures
- Minimised quality deterioration in dubbing
- Minimised cross colour distortion
- PCM digital sound
- No picture deterioration in LP Mode
- 6.35 mm-wide tape
- Compact cassette with long recording time
- Minimised quality deterioration in editing
- Time Code editing

Compatibility with S-VHS or VHS Cassettes

As this Movie Camera uses a digital method for recording picture and sound, there is no compatibility with conventional S-VHS or VHS video equipment using analog recording methods.

In addition, the size and shape of the cassette are completely different.

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Compatibility with Output Signals

As the video and audio signals output from the audio and video output sockets are analog—the same as in conventional video systems—you can connect this Movie Camera to your S-VHS or VHS VCR or TV for playback.

PCM Digital Sound

For recording of the sound, this Movie Camera offers the choice between two different PCM Audio Recording Modes.

- 16 bit, 48 kHz, 2 channels
 - 12 bit, 32 kHz, 4 channels
- The "16 bit, 48 kHz, 2 channels" Mode offers superior recording sound quality.
- The "12 bit, 32 kHz, 4 channels" Mode lets you record the original sound in stereo on two channels and the dubbed sound in stereo on two separate channels.

Sub Code

The digital recording system offers the added capability of recording sub code containing various data.

The following data is recorded as sub code on this Movie Camera:

- Time code
- Recording date and time
- Index signals for locating still images recorded in the Photoshot Mode
- Index signals for locating the beginning of scenes marked with index signal

Auto Focus Adjustment

The Auto Focus System automatically moves the internal focusing lens forward or backward and adjusts the focus so that the subject can be seen clearly. The Auto Focus Adjustment has the following characteristics:

- It adjusts until the vertical contours of the subject are as sharp and clean as possible.
 - It adjusts the focus on the subjects with strong contrast.
 - It adjusts the focus on the subject in the centre of the LCD Monitor or Finder.
- Unlike human eyes, the lens of the Movie Camera cannot instantaneously change the focus from a nearby to a distant subject and vice versa.

Lens Unit

The lens construction used in this Movie Camera generates some clicking noise if the Movie Camera is rocked up and down while it is turned off. This is not a malfunction of the lens unit. This noise does not occur when the Movie Camera is turned on.

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■ Focus

If you look at an object through a magnifying glass and move it closer or further away from your eye, you will reach a point where the object becomes clearly visible. Being focused or in focus means that the subject can be seen with optimum clarity and sharpness.

Human Eyes

Human eyes have lenses as well, and when we look at objects at different distances, the shape of these lenses changes automatically so that we can always see these objects clearly.

Movie Camera

The image of the subject enters the Movie Camera through the lens and is converted into an electric signal (video signal) for recording onto magnetic tape. The focus is adjusted either manually or automatically by moving a focusing lens.

For the following subjects and recording situations, the Auto Focus System cannot provide precise adjustment.
Use the Manual Focus Mode instead. (→ 86)

- 1 Recording subjects with a part of it near the Movie Camera and another part far away from it
As the Auto Focus adjusts on the centre part of the image, it is often impossible to bring the nearby and distant parts of the subject into focus.
When you want to record a person with a distant mountain in the back, it is not possible to focus on both.

- 2 Recording subjects behind glass covered with dirt or dust
As the focus is adjusted on the dirty glass, the subject behind the glass is out of focus. When recording a subject across a street on which cars are running, the focus may be adjusted on the cars.

- 3 Recording subjects in dark surroundings
As the amount of light information entering through the lens is greatly reduced, the Movie Camera cannot adjust the focus precisely.

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- 4 Recording subjects surrounded by objects with shiny surfaces or much light reflection
As the Movie Camera adjusts the focus on objects with shiny surfaces or much light reflection, the subject may go out of focus.
Therefore, when recording at a lake or the sea, evening scenes, fireworks, or under special types of lighting, the subject may be out of focus.

- 5 Recording fast-moving subjects
As the internal focusing lens is moved mechanically, it cannot follow fast-moving subjects without delay. Therefore, subjects like children running back and forth may temporarily go out of focus.

- 6 Subjects with weak contrast
As the Movie Camera adjusts the focus based on vertical contours in the picture, subjects with little contrast such as a white wall may be out of focus.

White Balance Adjustment

While most recording with a Movie Camera is probably done outdoors under sunlight, video recording is also done very often under artificial light sources, both indoors and outdoors. However, each of these light sources gives the subject slightly different colours.

Human Eyes

Human eyes can easily adjust to different kinds of lighting and see an object with the same colours even under different lighting.

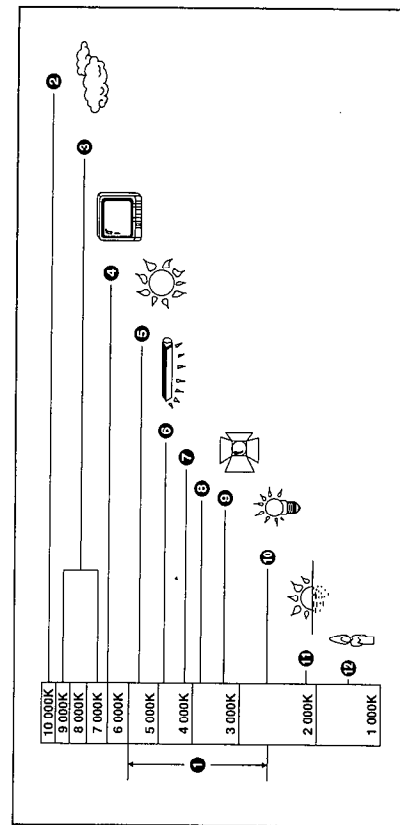
Movie Camera

Unlike human eyes, the Movie Camera does not have the innate ability to adapt to changes in lighting, and they influence the colours being recorded. Therefore, depending on the light source, the picture would be recorded with a bluish or reddish tint. To minimise the influence of the lighting on the colours of the subject, an adjustment called White Balance Adjustment is necessary.

White Balance Adjustment

The White Balance Adjustment determines the colour of the light and adjusts the colours so that white remains pure white. As white is the basic colour of the entire colour spectrum, if white is reproduced correctly, the other colours are correct and natural, too.

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Colour Temperature

Every light source has its own colour temperature measured in Kelvin (K). The higher the Kelvin value, the more bluish the light; the lower the value, the more reddish the light. The Kelvin value is related to the tint of the light, but not directly to its brightness.

The range 1 indicated in the illustration above shows the light sources for which this Movie Camera can provide precise white balance adjustment and, therefore, natural colours in the recorded pictures, when using the Full Auto Mode. For light sources outside this range, adjust the white balance manually (→ 84). Also, additional lighting may be necessary.

- 1 Control range of this Movie Camera's Auto White Balance Adjustment Mode

- 2 Blue sky
- 3 Cloudy sky (Rain)
- 4 TV screen
- 5 Sunlight
- 6 White fluorescent lamp
- 7 2 hours after sunrise or before sunset
- 8 1 hour after sunrise or before sunset
- 9 Halogen light bulb
- 10 Incandescent light bulb
- 11 Sunrise or sunset
- 12 Candlelight

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■ Time Code

Time Code signals are the data which indicates the time in hours, minutes, seconds and frames (25 frames/sec). Having this data included in the recording gives every single picture on the tape its own address.

- The Time Code is automatically recorded as part of the sub code with every recording you make.
- When you insert a new (previously unrecorded) cassette, the Time Code automatically starts from zero. If you insert a recorded cassette, the Time Code continues where the time code of the last previous scene stopped. (In this case, the zero indication [00000000] may appear after inserting the cassette, but when the recording starts, the Time Code records from the previous value.)
- You cannot reset the Time Code to zero.
- In playback modes other than the Normal Playback Mode, the Time Code may not be displayed (or not be correct).
- Unless the Time Code is recorded continuously from the beginning of the tape, precise editing may not be possible. To ensure that the Time Code is recorded without interruption, we recommend that you use the Camera Search Function (→ 58) or Blank Search Function (→ 60) before starting to record a new scene.

■ Memory Stop Function

The Memory Stop Function is convenient for the following operations.

Rewinding or fast-forwarding the tape to a desired position

- 1 Reset the Tape Counter to zero at the tape position from which you want to play back later. (→ 100, 134)
- 2 Set [DISPLAY] on the [CAMERA MENU2] Menu or [VCR MENU2] Menu to [MEMORY].
- 3 Start playback or recording.

- 4 After playback or recording is finished: Set the [POWER] Switch to [VCR].
- 5 Rewind the tape.

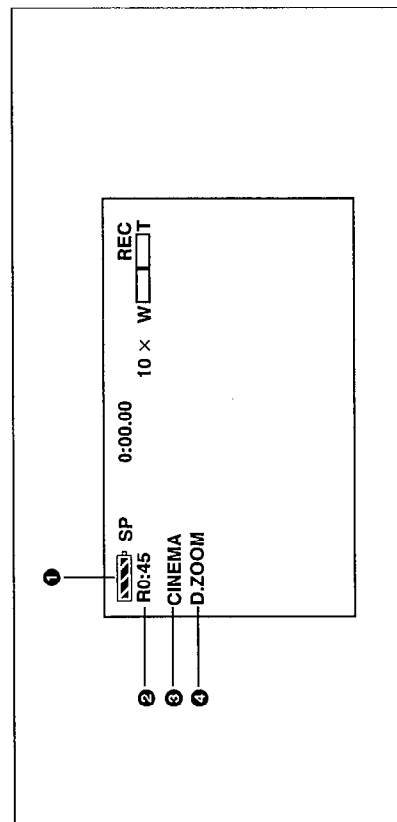
The tape automatically stops approximately at the position at which you reset the counter to zero.

Stopping the editing automatically in the audio dubbing

- 1 Reset the Tape Counter to zero at the tape position at which you want the editing to stop.
- 2 Set [DISPLAY] on the [CAMERA MENU2] Menu or [VCR MENU2] Menu to [MEMORY].
- 3 Play back a still picture at the point at which you want the audio dubbing to start.
- 4 Start the audio dubbing. (→ 96)

The audio dubbing automatically stops approximately at the position at which you reset the counter to zero.

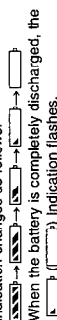
-168-



Indications on the LCD Monitor/in the Finder

① Remaining Battery Power

As the remaining battery power decreases, the indication changes as follows:



When the battery is completely discharged, the [] indication flashes. (When you are using the AC Adaptor, the indication may appear, however, this has no meaning in this case.)

② Remaining Tape Time

The remaining tape time is displayed in minutes. (When it becomes less than 3 minutes, the indication starts flashing.)

- If a recording lasts less than 15 seconds, the remaining tape time cannot be displayed correctly.
- The displayed remaining tape time may be shorter than the actual remaining tape time.

③ Cinema Mode (→ 42)

When recording in the Cinema Mode, this indication is displayed.

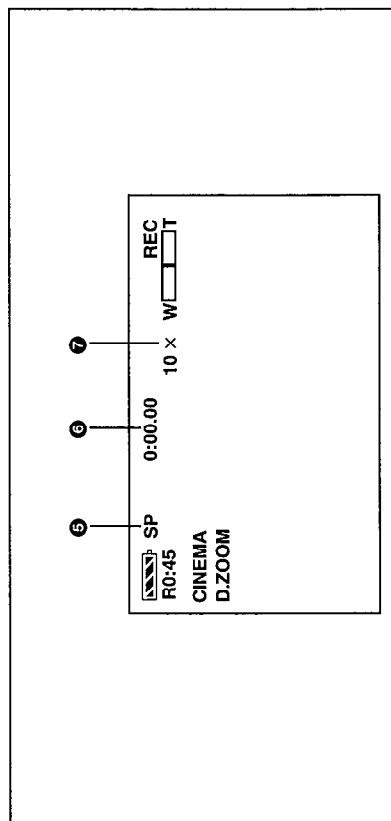
④ Digital Zoom (→ 38)

When the Digital Zoom Function is activated, this indication is displayed.

Digital Effects (→ 74)

When a digital effect is activated, the corresponding indication is displayed.

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⑤ Recording Speed Mode (→ 24)

The selected Recording Speed Mode is displayed.

SP: Standard Mode

LP: Long-play Mode

⑥ Tape Counter, Time Code (→ 176)

The Tape Counter, Memory Stop Function or Time Code indication is displayed.

⑦ Zoom Magnification (→ 38)

When you push the [W/T] Zoom Lever up or down, the Zoom Magnification indication and the Zoom Gauge are displayed.

Recording Mode (→ 32, 82, 84, 86, 88, 90)

AUTO: This appears when the Mode Selector Switch is set to [AUTO].

MNL: This appears when the Mode Selector Switch is set to [MNL].

Super Image Stabilizer (→ 44)

When the Super Image Stabilizer Function is activated, this indication is displayed.

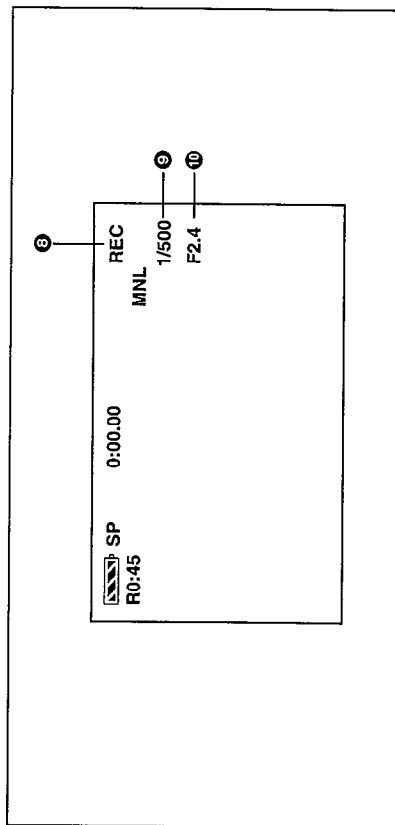
Audio Recording Mode (→ 96)

The indication of the Audio Recording Mode that was selected for recording is displayed during playback.

Automatic Printing (→ 122)

AUTO PRINT: This indication is displayed when the Auto Print Function is being used.

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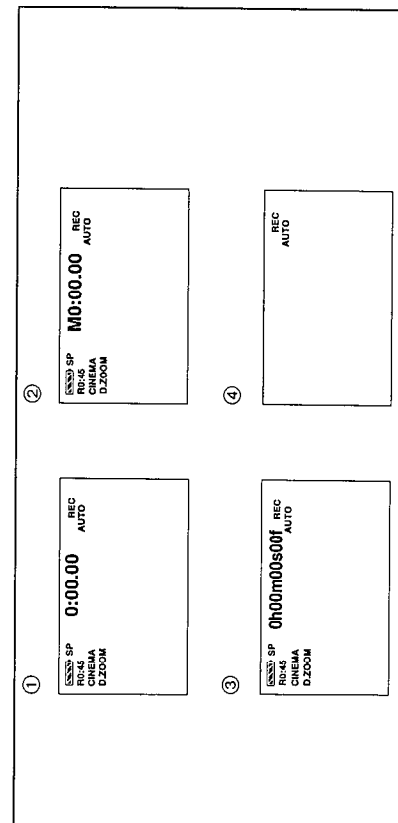


8 Tape Run Indications

- REC:** Recording (→ 32)
PAUSE: Recording Pause (→ 32)
D>: Playback (→ 46)/Camera Search in forward direction (→ 58)
<D: Camera Search in reverse direction (→ 58)
II: Still Playback (→ 52)
II>: Fast-forward/Cue Playback (→ 48)
<<D: Rewind/Review Playback (→ 48)
II>>: Slow Playback in forward direction (→ 50)
II>>>: Still Advance Playback in forward direction/Still Advance Playback in reverse direction (→ 52)
D>>II>>: Index Search in forward direction (→ 62, 64, 66)

- CHK:** Recording Check (→ 34)
A.DUB D>: Audio Dubbing (→ 96)
A.DUB II: Audio Dubbing Pause (→ 96)
PHOTO: Recording in the Photoshot Mode (→ 40)
BLANK: Blank Search (→ 60)
R D>: Repeat Playback (→ 46)
- When recording with the LCD Monitor facing forward using the Mirror Mode, only the Remaining Battery Power Indication, the Recording Indication [●] and the Recording Pause Indication [●II] are displayed.
- 9 Shutter Speed**
 When you manually adjust the shutter speed, this indication is displayed. (→ 88)
- 10 Iris Value (F Number)**
 When you manually adjust the iris, this indication is displayed. (→ 90)

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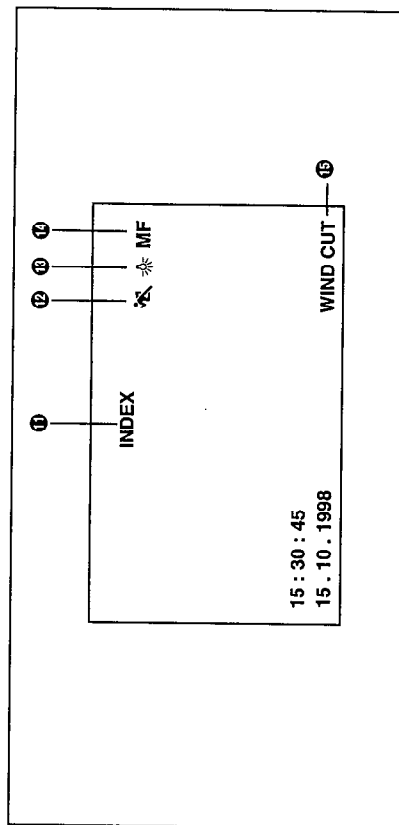


Changing the Indications

By changing the setting for [DISPLAY] on the [CAMERA MENU2] Menu or [VCR MENU2] Menu, or by repeatedly pressing the [DISPLAY] Button on the Remote Controller (→ 100), the Counter Display Mode can be changed in the order shown in the above illustrations ①-④.

- ① Tape Counter Indication
- ② Tape Counter Indication with activated Memory Stop Indication

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11 Index (→ 62)

The [INDEX] Indication flashes for a few seconds while an index signal is being recorded.

Search Number (→ 66)

The figure indicates which number of scene ahead from the present scene is to be played back.

12 Programme AE Mode (→ 70)

The Programme AE Function offers the following settings:

- SPORTS: Sports Mode
- PO: Portrait Mode
- LOW: Low Light Mode

13 White Balance Mode (→ 82)

The White Balance Mode offers the following possible settings:

- ★: Indoor Mode (recording under incandescent lamp)
- ★: Outdoor Mode
- ★: Last manually adjusted White Balance setting

When the Movie Camera is in the Auto Mode, none of the above 3 indications are displayed.

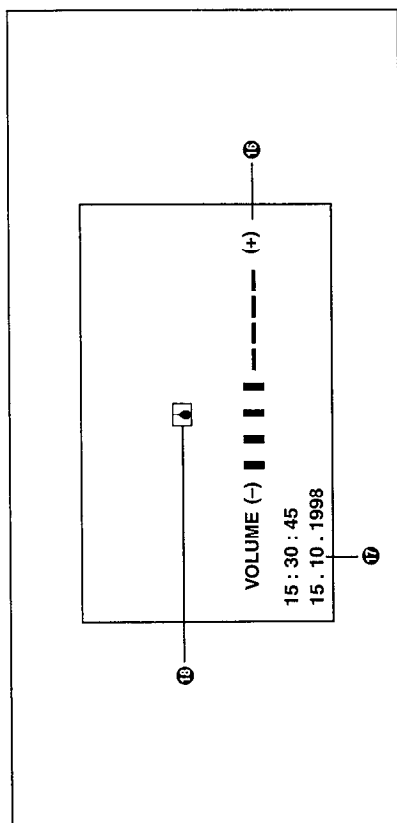
14 Manual Focus (→ 86)

If you select the Manual Focus Mode, the [MF] Indication is displayed.

15 Wind Noise Reduction [WIND CUT]

If you set [WIND CUT] on the [CAMERA MENU2] Menu to [ON], the [WIND CUT] Indication is displayed.

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16 Sound Volume (→ 46)

Use this indication to adjust the volume of the playback sound from the built-in speaker. Set the [POWER] Switch to [VCR] and keep the [PUSH] Dial pressed until the [VOLUME] Indication appears. Then turn the [PUSH] Dial to adjust the volume.

17 Date and Time (→ 46)

The time is indicated in the 24-hour system.

18 Warning/Alarm

When any of the following indications lights or flashes, confirm the condition of the Movie Camera.

: Condensation has occurred. (→ 148)
 : The erasure prevention slider of the inserted cassette is open (set to [SAVE]).

: No cassette is inserted.
 : The built-in battery is discharged. (→ 140)

: The video heads are dirty.

END : During recording, the tape has reached its end.

REMOTE : Wrong Remote Controller Mode is selected. (→ 110)

PRINTER

ERROR : This indication is displayed if you set [AUTOPRINT] on the [VCR MENU2] Menu to [ON] when no printer is connected to the Movie Camera. (→ 122)

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Before Requiring Service (Problems & Solutions)

Power Supply

P1: The Movie Camera does not turn on.

S1: Is the Battery or the AC Adaptor connected correctly? Confirm the connection. (→ 16)

P2: The Movie Camera has turned off automatically.

S2: If you leave the Movie Camera in the Recording Pause Mode for more than 6 minutes, it automatically switches off to protect the tape and to conserve battery power. (→ 32)

P3: The Movie Camera quickly turns off.

S3-1: Is the Battery discharged? When the Remaining Battery Power Indication is flashing or the Indication is displayed, the Battery is discharged. Charge the Battery or attach a fully charged Battery. (→ 18, 170)

S3-2: Has condensation formed? If the Movie Camera is brought from a cold to a warm place, condensation may form inside. In this case, the Movie Camera automatically switches off and no operation can be performed except taking out the cassette. Wait until the Condensation Indication disappears. (→ 148)

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Battery

P1: The Battery discharges quickly.

S1-1: Is the Battery fully charged? Charge it until all 3 Charge Lamps on the AC Adaptor light. (→ 18)

S1-2: Are you using the Battery in a place where the temperature is very low? The ambient temperature greatly influences the Battery's performance. Its operation time becomes shorter in a cold place. (→ 152)

S1-3: Has the Battery reached the end of its service life? The service life of the Battery is limited, it depends on the way the Battery is used, but when the operation time even after proper charging is too short for normal use, the service life of the Battery has reached its end.

P2: The Battery cannot be charged.

S2: If the DC Input Cable is connected to the AC Adaptor, charging is not possible. Disconnect the DC Input Cable.

Normal Recording

P1: Recording cannot be started even though the Movie Camera is supplied with power and the cassette is inserted correctly.

S1-1: Is the erasure prevention slider of the cassette open? If it is open (set to [SAVE]), recording is not possible. (→ 22)

S1-2: Has the tape reached its end? Insert a new cassette. (→ 22)

S1-3: Is the Movie Camera turned on? (→ 32)

S1-4: Is the [POWER] Switch set to [CAMERA]? When it is set to [VCR], recording is not possible. (→ 32)

S1-5: Is the Condensation Indication displayed? When condensation has formed, no functions except taking out the cassette can be operated. Wait until the Condensation Indication disappears. (→ 148)

Other Recording

P1: The picture on the LCD Monitor/in the Finder suddenly stands still for a few seconds.

S1: Did you press the [PHOTO SHOT] Button? If you press the [PHOTO SHOT] Button, a still picture is recorded for approximately 7 seconds. After approximately 7 seconds, the Movie Camera switches back to the Recording Pause Mode. (→ 40)

P2: The Auto Focus Function does not work.

S2-1: Is the Manual Focus Mode selected? If you select the Auto Focus Mode, the focus is adjusted automatically. (→ 86)

S2-2: Is the subject or recording situation suitable for the Auto Focus Mode? The Auto Focus Function does not work correctly for some kinds of subjects and recording situations. In this case, use the Manual Focus Mode to adjust the focus. (→ 86)

Editing

P1: Audio dubbing cannot be performed.

S1-1: Is the erasure prevention slider of the cassette open? If it is open (set to [SAVE]), editing is not possible. (→ 22)

S1-2: Are you trying to edit parts of the tape recorded in the LP Mode? As the tracks recorded in the LP Mode are narrower than the heads, audio dubbing is not possible. (→ 24, 96)

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Indications

- P1:** The Time Code becomes incorrect.
S1: In the Slow Motion Playback Mode in reverse direction, the counter of the Time Code Indication may not be stable, however, this is not a malfunction.
- P2:** The Remaining Tape Time Indication disappears.
S2: If you record a still picture in the Photoshot Mode, the Remaining Tape Time Indication may disappear temporarily. However, if you switch the Movie Camera over to the Normal Recording Mode, it appears again.
- P3:** The Remaining Tape Time Indication does not match the actual remaining tape time.
S3-1: If scenes of less than 15 seconds are recorded successively, the remaining tape time is not indicated correctly.
S3-2: The Remaining Tape Time Indication may show a remaining tape time that is 2-3 minutes shorter than the actual remaining tape time.

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Playback (Sound)

- P1:** No sound is played back from the Movie Camera's built-in speaker.
S1: Is the volume set too low? During playback, keep the [PUSH] Dial pressed until the [VOLUME] Indication appears. Then turn the [PUSH] Dial to adjust the volume. (→ 46)
- P2:** Different sounds are played back together.
S2: [12bit AUDIO] on the [VCR MENU1] Menu is set to [MX]. Therefore, the original sound and the sound dubbed with audio dubbing are played back together. It is also possible to play them back individually. (→ 98)
- P3:** The original sound was erased by performing audio dubbing.
S3: If you perform audio dubbing on a recording made in the [16bit] Mode (→ 95), the original sound is erased. If you want to keep the original sound, be sure to select the [12bit] Mode for the original recording.
- P4:** No playback sound is reproduced.
S4-1: Are you playing back a cassette that was recorded with [AUDIO REC] on the [CAMERA MENU2] Menu set to [12bit]? In this case, make sure that [12bit AUDIO] on the [VCR MENU1] Menu is set to [ST1] (→ 98).
S4-2: Is the Variable Speed Search Function activated? Press the Play Button (▶) to cancel the Variable Speed Search Function (→ 48).

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Playback (Picture)

- P1:** No playback picture is reproduced when pressing the Play Button (▶).
S1: Is the [POWER] Switch set to [VCR]? When it is set to [CAMERA], no playback function can be operated. (→ 46)
- P2:** Mosaic-like patterns appear in the picture during Cue, Review or Slow Motion Playback.
S2: This phenomenon is a characteristic of the digital video system. This is not a malfunction. (→ 46)
- P3:** I want to play back the picture on a TV.
S3: Attach the Output Terminal Box [AV ONE TOUCH STATION] to the Movie Camera and use the AV Cable (PHONO-PHONO) to connect it to the TV. Or use the AV Cable (PHONO-M3) to connect the Movie Camera directly to the TV. (→ 54)
- P4:** The Movie Camera is correctly connected to a TV, but no playback picture is reproduced.
S4: Did you select "Video Input" on the TV? Carefully read the operating instructions for your TV and select the channel that matches the input sockets used for connection.
- P5:** The playback picture is not reproduced clearly.
S5: Are the video heads on the Movie Camera dirty? If the video heads are dirty, the picture cannot be played back clearly. (→ 150)

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Others

- P1:** The cassette cannot be taken out.
S1-1: Is the Movie Camera supplied with power? Is the AC Adaptor correctly connected or the Battery correctly attached? To remove the cassette, the Movie Camera must be supplied with power, however, it is not necessary to set the [POWER] Switch to [CAMERA] or [VCR].
S1-2: The attached Battery may be discharged. Replace it with a charged Battery.
- P2:** No operation except taking out the cassette can be performed.
S2: Is the Condensation Indication [] displayed? If condensation has formed inside the Movie Camera, it automatically switches off and prevents all operations except taking out the cassette. Wait until the Condensation Indication disappears. (→ 148)
- P3:** The Remote Controller does not work.
S3-1: Is the button-type battery in the Remote Controller exhausted? If the Remote Controller does not work when you use it near the Remote Controller Sensor on the Movie Camera, the button-type battery is exhausted. Replace it with a new battery. (→ 108)
S3-2: Is the correct Remote Controller Mode selected? If the Movie Camera's setting for [REMOTE] on the Menu and the mode selected on the Remote Controller are not matched, operating the Movie Camera with the Remote Controller is not possible and the [REMOTE] Indication is displayed. (→ 110)

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1 CGP-D110	2 CGP-D120	3 CGP-D210	4 CGP-D220	5 CGP-D815	6 VW-K7E	7 VW-K10E
8 VW-LW3007E	9 VW-LT3014E	10 VW-LND30E	11 VW-VMS1E	12 VW-SK10E	13 VZ-CT55E	14 VW-EC500E
15 VW-EC1E	16 VW-VT1E	17 VW-DTA1E	18 VW-HSE	19 VW-CD1E		

Optional Accessories

- 1 Battery Pack (Lithium)
2 Battery Pack (Lithium)
3 Battery Pack (Lithium)
4 Battery Pack (Lithium)
5 Battery Pack (Lithium)
6 Car Adaptor Cord
7 5-Pin Synchro Cord
8 Wide Conversion Lens
9 Tele Conversion Lens
10 ND Filter
- 11 Stereo Zoom Microphone
12 Shoe Adaptor
13 Tripod
14 Editing Controller
15 Editing Controller
16 Video Tiller
17 Personal Computer Connection Kit
18 Edit Cable
19 DV Cable
- Some accessories are not available in some countries.

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SECTION 2

ADJUSTMENT PROCEDURES

2-1. DISASSEMBLE FLOW CHART

This flow chart indicates the disassembly steps the cabinet parts, C.B.A. and Mechanism Unit in order to access to items to be serviced. When reinstalling, perform the steps in the reverse order.

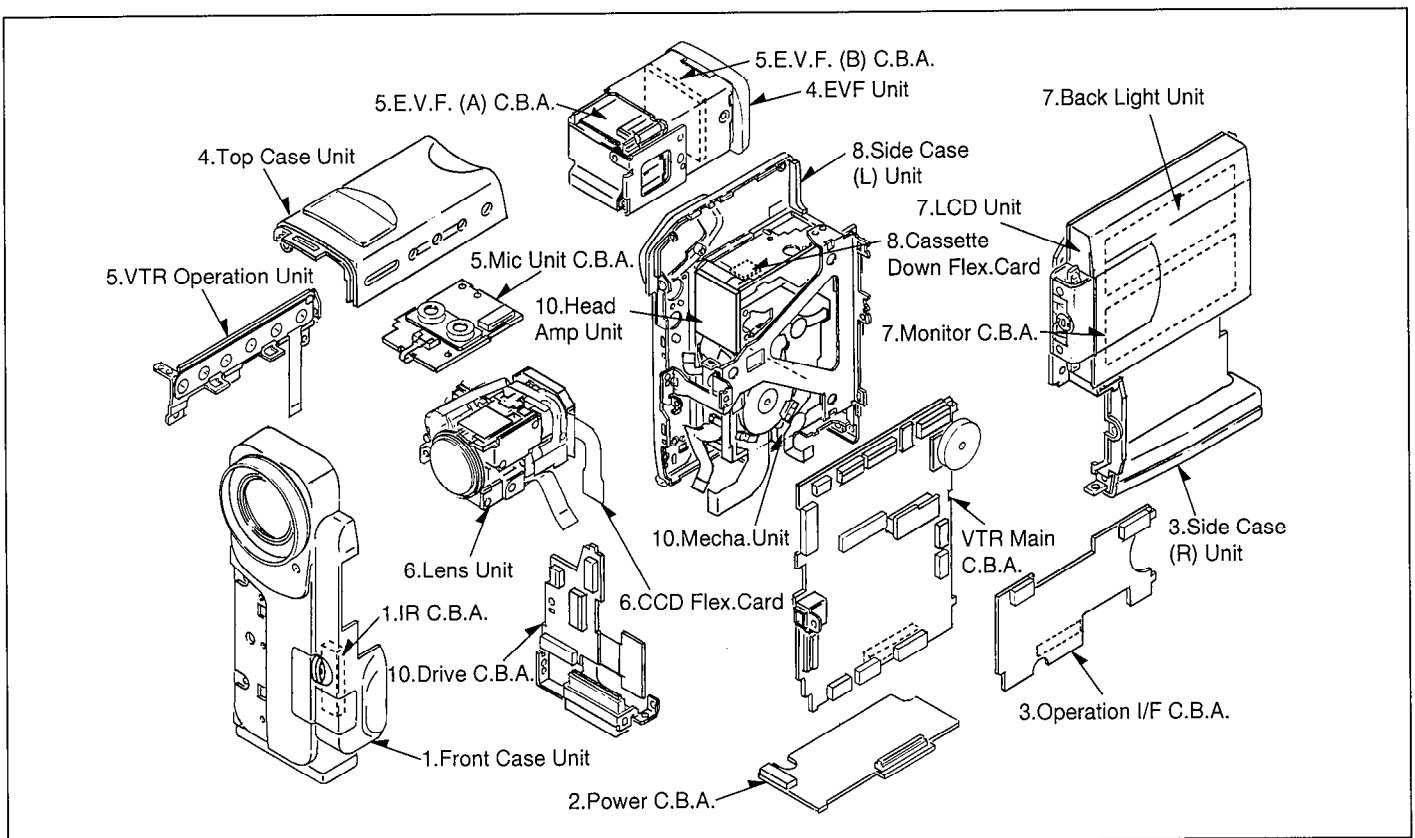
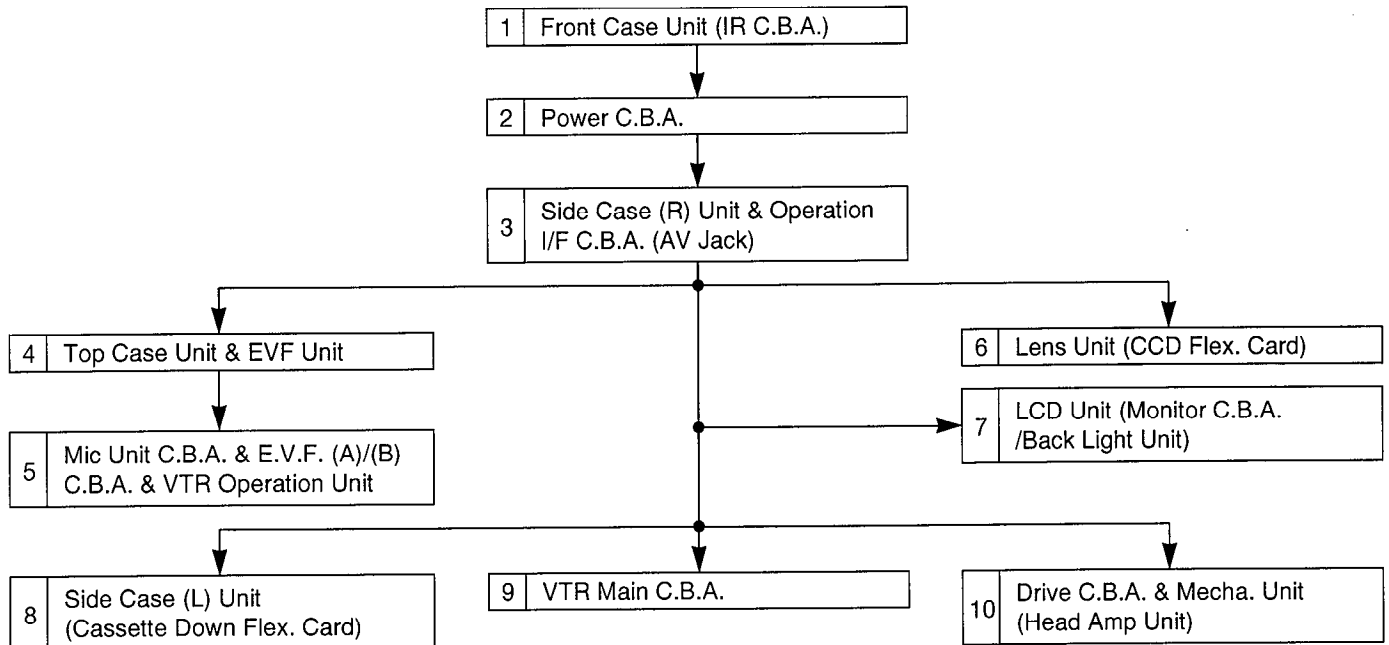


Fig. F1

2-2. DISASSEMBLY PROCEDURES

Flow-chart Disassembly procedure

No.	Item / Part	Fig.	Removal (Screw & Other)
(1)	Front Case Unit	Fig. 1	2-Screws (A) Unlock—Locking Tabs Remove the Grip Cover. 7-Screws (B/C/D/E) Disconnect FP6304. Remove the Front Case Unit.
(2)	Power C.B.A.	Fig. 2	2-Screws (F) Unlock—Locking Tab Remove the Bottom Case Unit. Disconnect PS1001/FP1001.
(3)	Side Case (R) Unit & Operation I/F C.B.A.	Fig. 3-1 Fig. 3-2	8-Screws (G/H/I/J) Disconnect FP601/FP602/FP3301. Remove the Side Case (R) Unit. Disconnect FP6702/PP3401/FP6302. Remove the Operation I/F C.B.A.
(4)	Top Case Unit & EVF Unit	Fig. 4	2-Screws (K/L) Disconnect FP4201/FP801.
(5)	Mic Unit C.B.A. & E.V.F. (A)/(B) & VTR Operation Unit	Fig. 5	1-Screw (M) 2-Screws (N) Unlock—Locking Tabs Remove the Mic Unit C.B.A. & E.V.F. (A)/(B) C.B.A. & VTR Operation Unit.
(6)	Lens Unit	Fig. 6	1-Screw (O) Disconnect PS201/FP701. Remove the Lens Unit.
(7)	LCD Unit	Fig. 7	3-Screws (P) Remove the LCD Top Case Unit. 1-Screw (Q) Remove the LCD Flex. Fixing Piece. Disconnect the FP905 & remove the Hall Sensor Flex. Card. Disconnect the FP901/FP902/FP903 and FP904. Unlock—Locking Tab Remove the Monitor C.B.A.
(8)	Side Case (L) Unit	Fig. 8	4-Screws (R/S) Disconnect FP6001/FP6303. Unlock—Locking Tabs Remove the Side Case (L) Unit.
(9)	VTR Main C.B.A.	Fig. 9	Disconnect FP2204/PS2001/FP3201. Unlock—Locking Tabs Remove the VTR Main C.B.A.
(10)	Drive C.B.A. & Mecha. Unit	Fig. 10	1-Screw (T) Disconnect FP2201/FP2202/FP2203. Unlock—Locking Tabs Remove the Drive C.B.A. 3-Screws (U) Remove the Mecha. Unit.

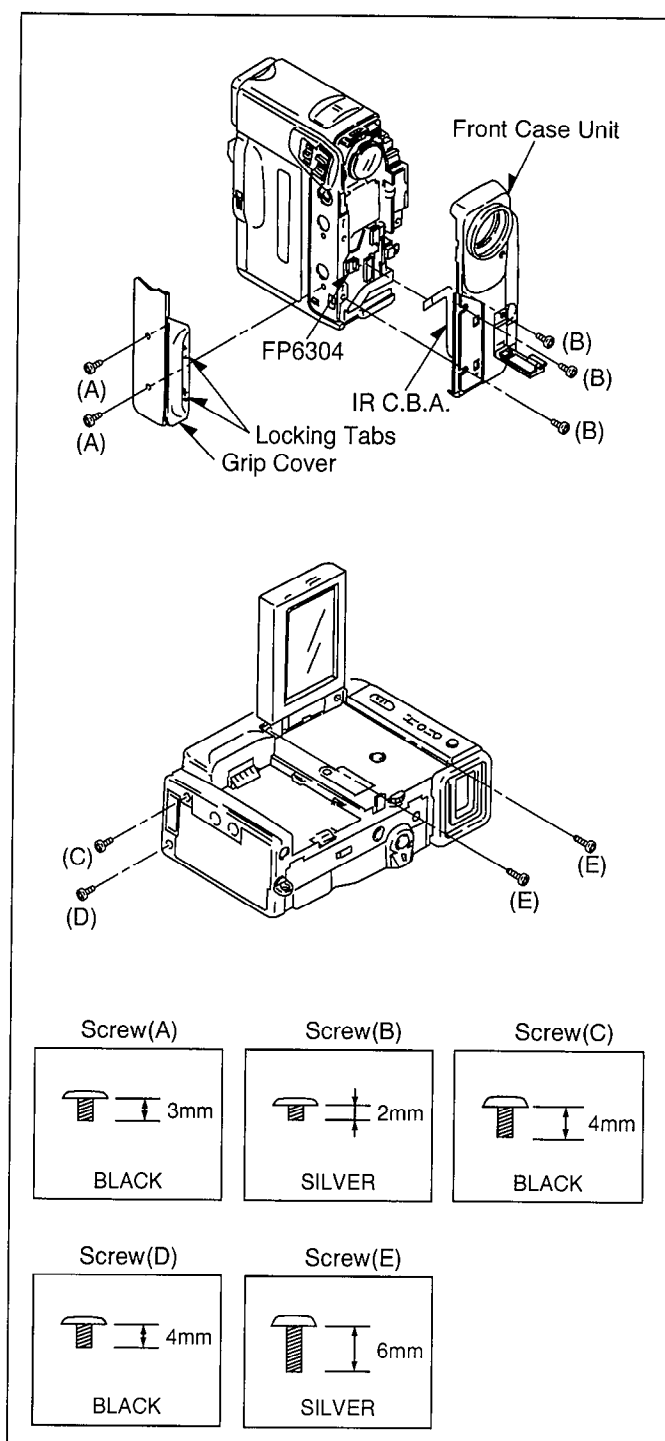


Fig. 1

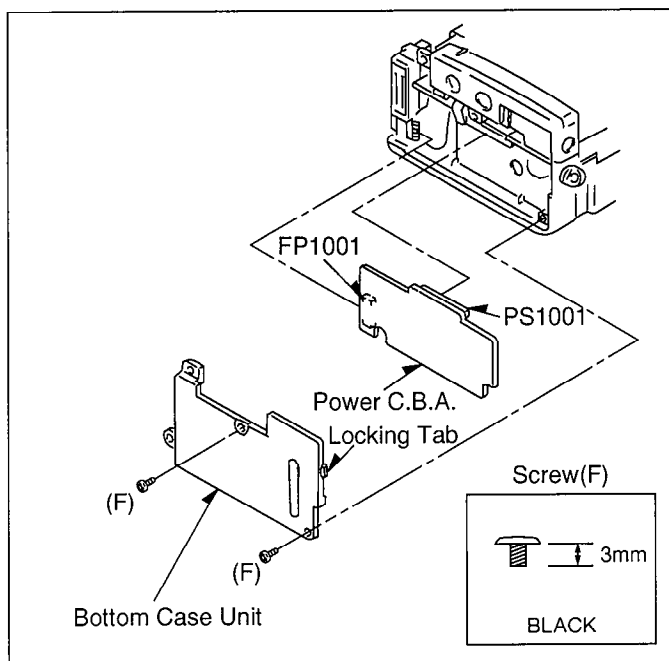


Fig. 2

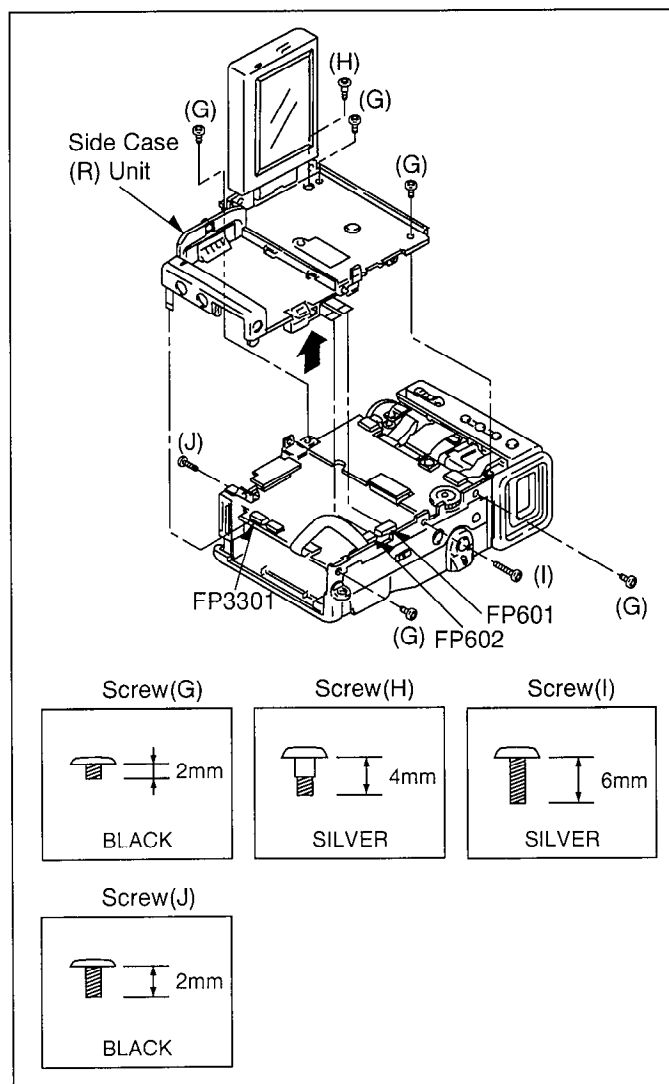


Fig. 3-1

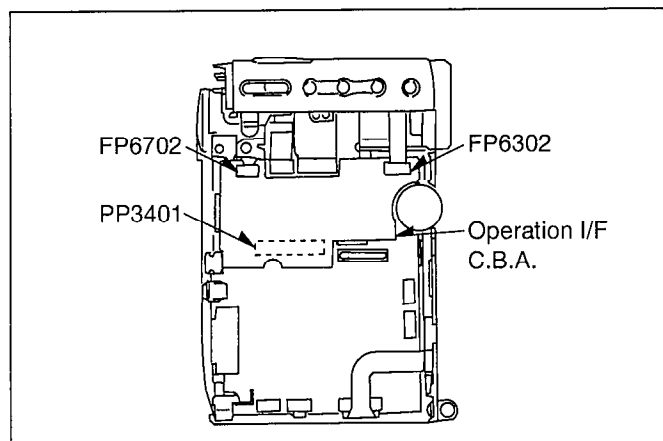


Fig. 3-2

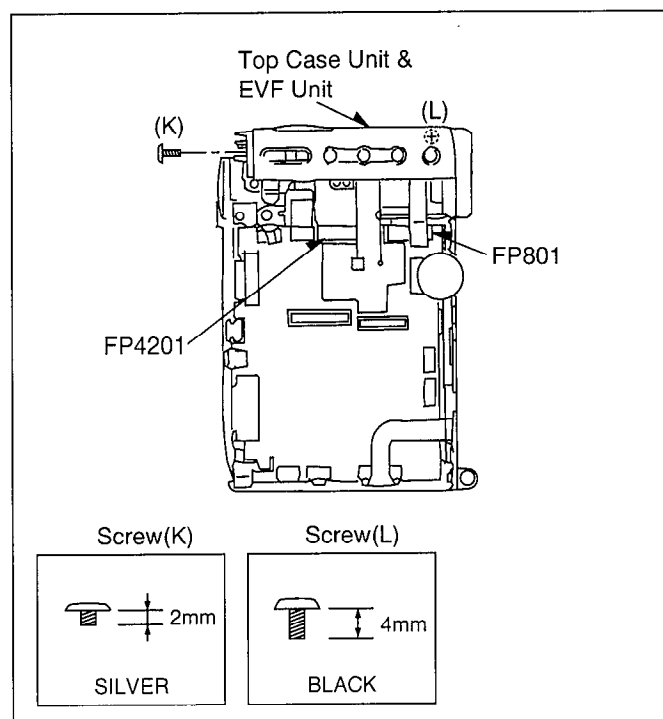


Fig. 4

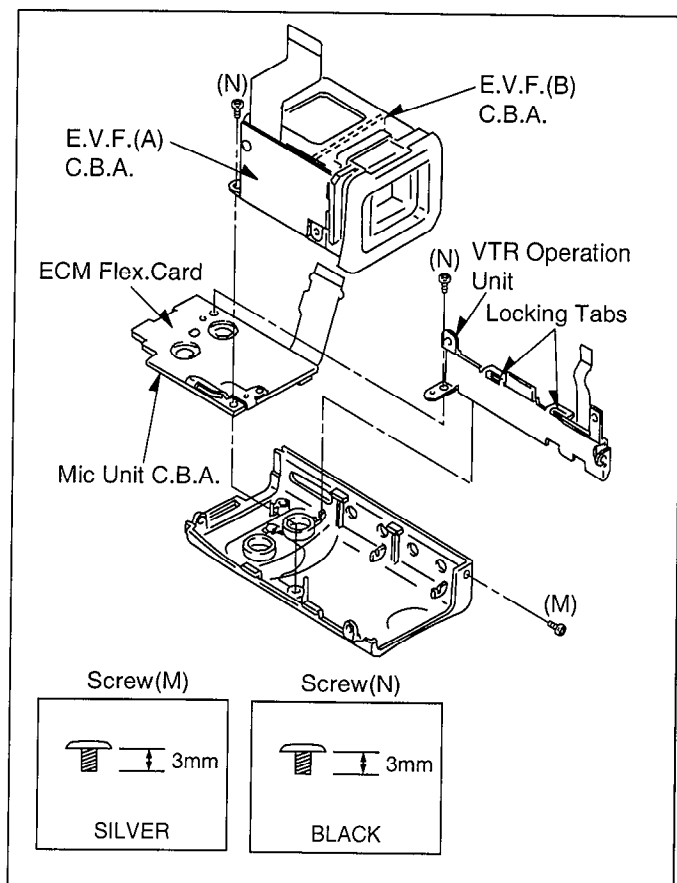


Fig. 5

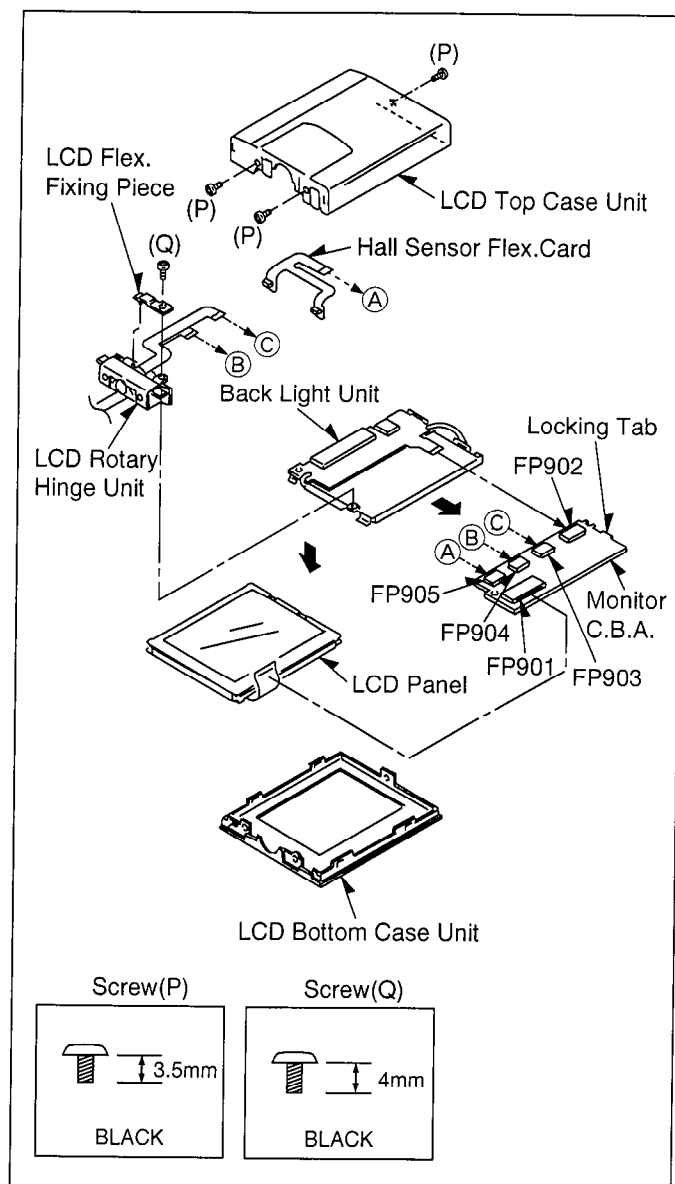


Fig. 7

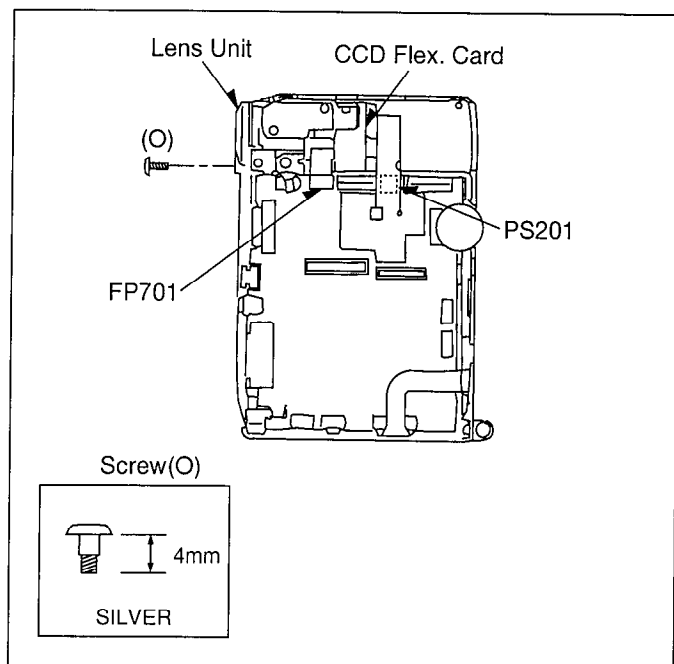


Fig. 6

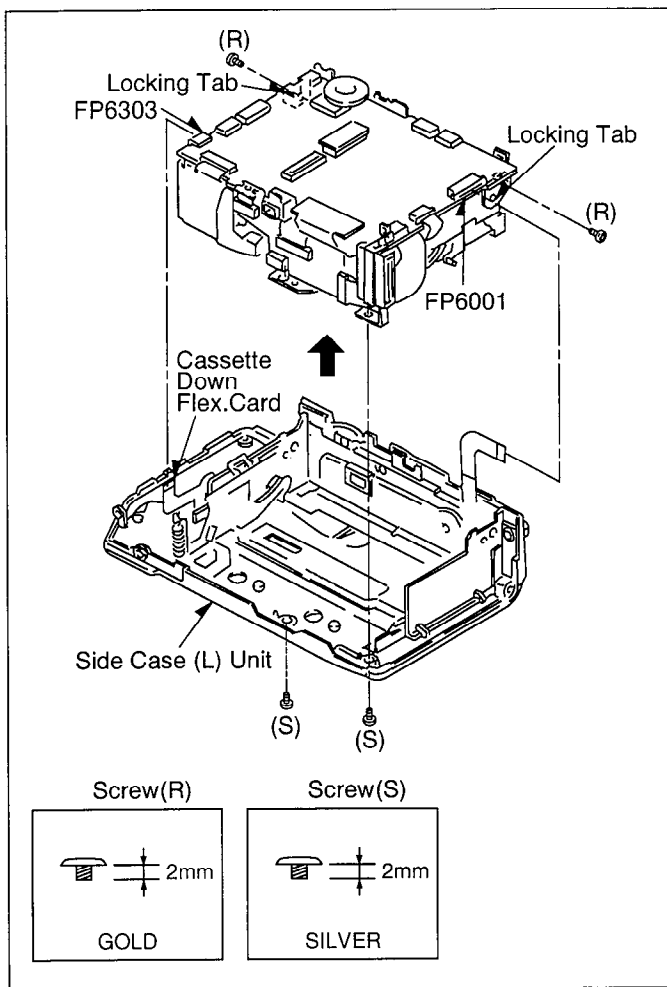


Fig. 8

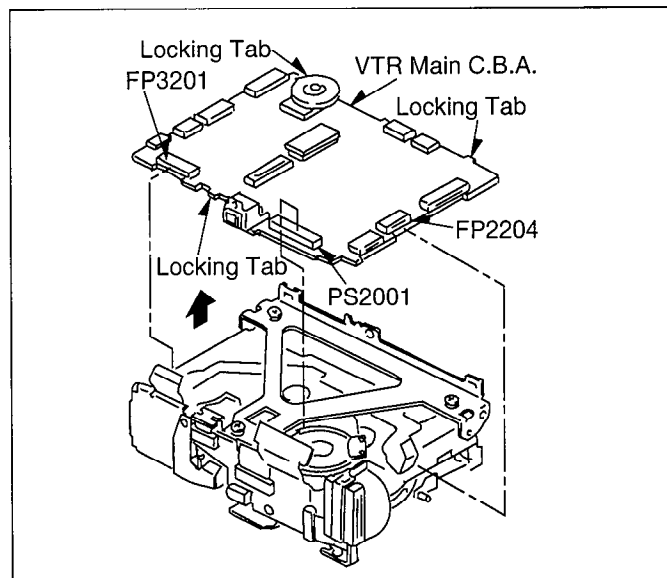


Fig. 9

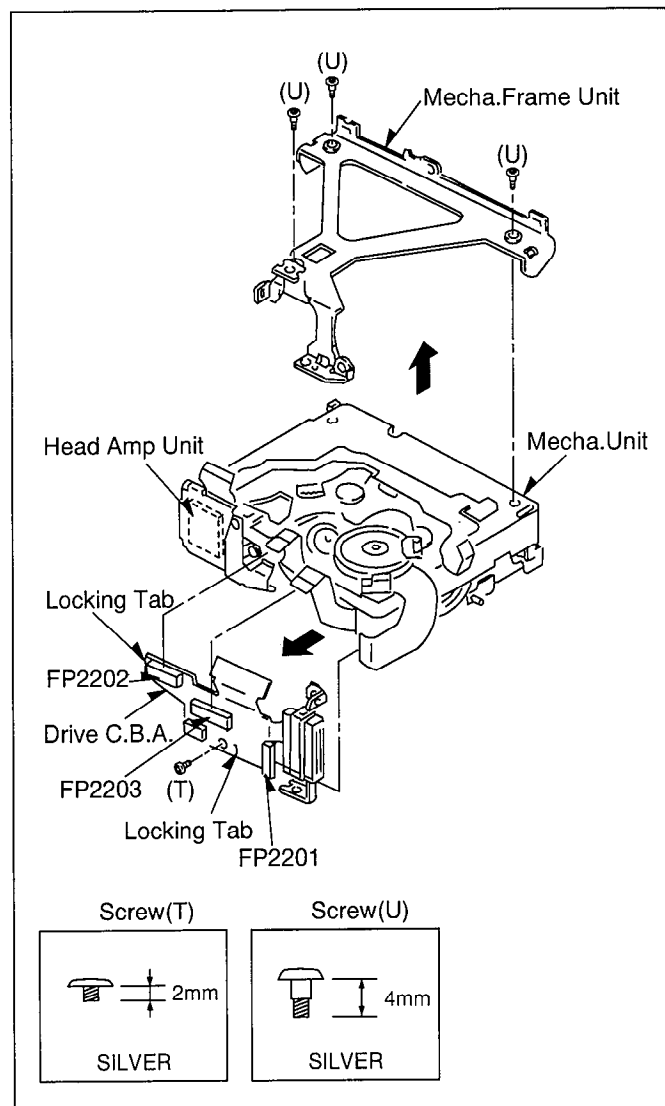


Fig. 10

2-3. DISASSEMBLY PROCEDURES OF LENS UNIT

The following flowchart describes order or steps for removing the lens units and certain printed circuit boards in order to make access to the item needing service.

To reassemble the unit follow the steps in reverse order.

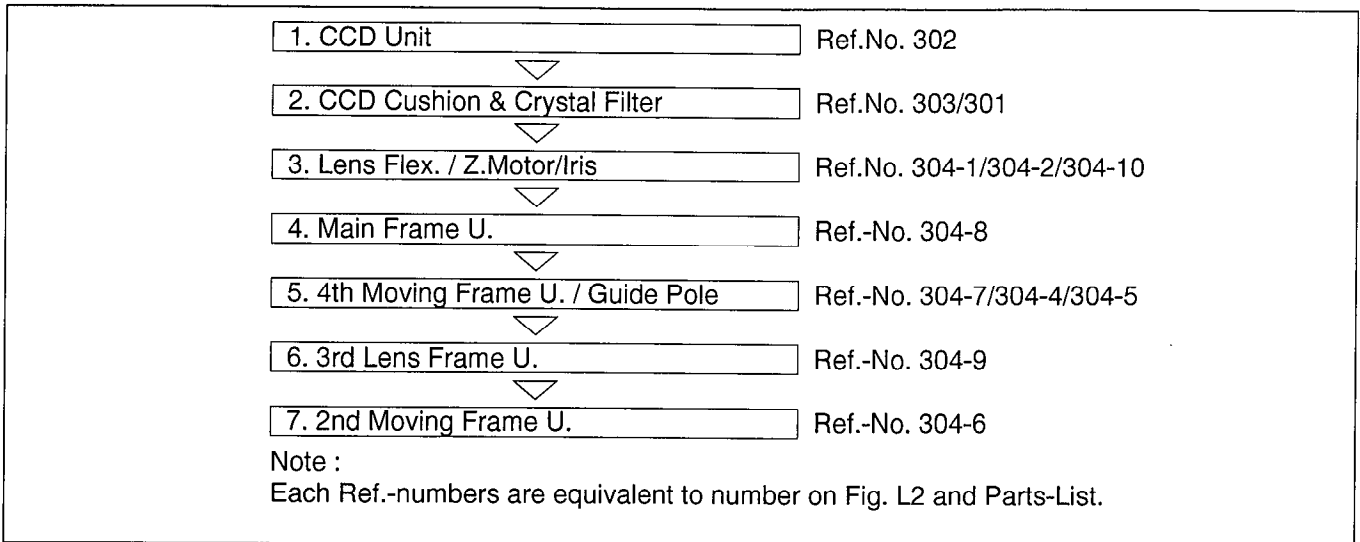


Fig. L1

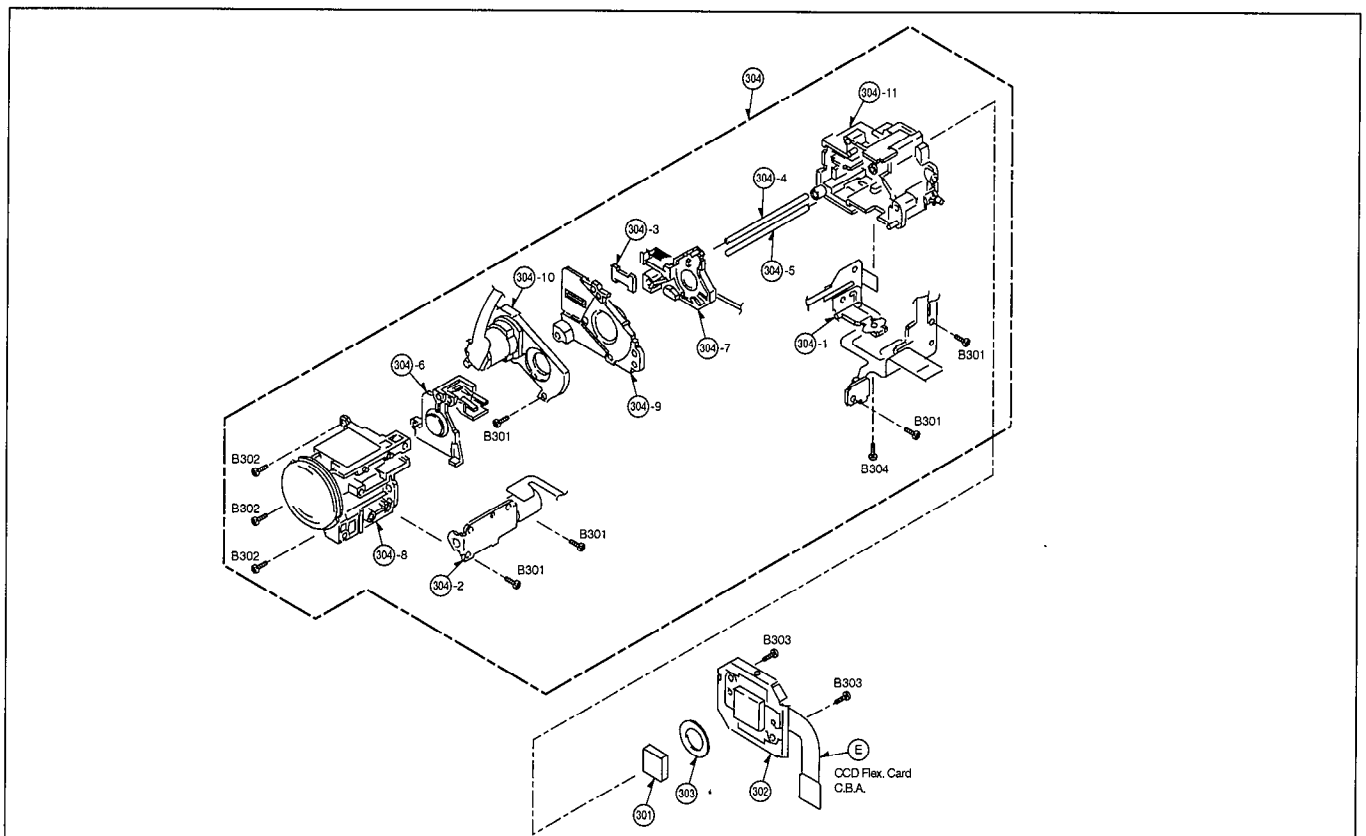


Fig. L2

SECTION 3

BLOCK DIAGRAMS & SCHEMATIC DIAGRAMS

3-1. ABBREVIATIONS

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
A	A GND	Analogue GND	ALC MAIN	Auto Level Control Drive	
	A HASW	Audio Head Amp Switching Pulse	ALE	Address Latch Enable	
	A HSW	Audio Switching Pulse	A-LOCK	Full Auto Switch	
	A MUTE	Audio Mute	A-MUT(H)	Audio Mute (H)	
	A ORP	Audio Overlap Pulse	ANLPTH	Analogue Loop Through High	
	A. TR	Auto Tracking	AORP	Audio Overlap Pulse	
	A0-8, 0-17	Memory Address	APCNT	Aperture Control	
	A3V2	AD Converter Reference Voltage	APS	Auto Power Save	
	AB0-4	Address Bus	ART VH	Artificial Vertical Sync	
	AB0-4, AB12-15	Address Bus Line 0-4, 12-15	AT CNT	Automatic Tracking Gain Adjust	
	ABSF	Focus Encoder Input	ATF	Automatic Track Finding	
	ACI	Analogue Channel Cording IC	ATFCLK	41.85MHz Clock	
	AD	AD Converter	ATFG	Auto Track Gain	
	AD	Auto Date, Analogue Digital Converter	ATL	Auto Lock Select	
	AD CLK	AD Clock	ATN	Absolute Track Number	
	AD REC	Audio Delayed REC	ATR OFF(H)	Auto Tracking Off (H)	
	AD0-6	Address	ATV	Advanced TV	
	AD0-6, ADR0-6	Address Data Line	AUDIO(N)	Audio (Normal)	
	ADCLK	Analogue Digital Converter Clock	AUX	Auxiliary	
	ADCNT	Analogue Digital Control	AVDD	Analogue VDD	
	ADCS	Analogue Digital Chip Select	AVSS	Analogue Ground	
	A-DET	Audio Detect	AWTB	Auto White Balance B-Y	
	ADREC	Audio Delaied Rec	AWTR	Auto White Balance R-Y	
	ADUB	Audio Dubbing			
	AE	Auto Expose	B	BACK	Back-up
	AECNT	Auto Expose Control		BACK UP	Microcomputer Back-up
	AEE(H)	Audio E-E (H)		BACK VDD	Back-up Power
	AEH	Audio Erase Head		BATT	Battery
	AEIRQ	Auto Expose Interrupt Request		BATT ALARM	Battery Alarm
	AF/MF	Auto Focus/Manual Focus		BATT REF	Reference Voltage for Battery
	AF DIS CS	AF DIS Chip Select		BCB	B Carrier Balance
	A-FADE(L)	Audio Fade (L)		BCBM(B-Y)	B-Y Carrier Balance
	AF-AMP	AF HALL Bias		BCBM(R-Y)	R-Y Carrier Balance
	AFCS	Auto Focus Chip Select		BD0-7	REC/Play In/Out Buss
	AFRP	Audio PLL Voltage Control		BDCK	Standard Bus Data Clock (9MHz)
	AF-VN	Zoom Encoder V-Ref (-)		BDEN	Standard Bus Data Enable
	AF-VP	Zoom Encoder VREF (+)		BEND	Data Block End Request
	AGC	Automatic Gain Control		BF	Burst Flag Pulse
	AGCCNT	Automatic Gain Control Control		BFA	Burst Flag Pulse for Encoder
	AGND	Analogue Ground/Audio Ground		BFO/BFI	Burst Flug Input/Output
	AGS	Anti Ground Shooting		BI, BO	Buffer Input, Output
	AH(P) / (R)	Audio Head (Play) / (Record)		BL	Back Light
	AHASW	Audio Head Amp Switch Pulse		BL ON	Back Light ON (L)
	AHSW	Audio Head Switch Pulse		BL4V	Back Light 4V
	AI, AO	Buffer Input, Output		BLC 0, 1	Back Light Y Control Out, In
AIBCK	Bit Clock (to A/D Converter)		BLDI/O	Back Light Drive Input/Output	
AIDAT	Serial Data (to A/D Converter)		BLK	Blanking Pulse	
AILRCK	L/R Clock (to A/D Converter)		BLKA	Blanking for Encoder	
AIMCK	Master Clock (to A/D Converter)		BLKA	Blanking Pulse for Encoder	
ALC CNT	Auto Level Control Control		BLKI/O	Blanking Pulse In/Out	

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	BLKZ	Blanking Pulse for Zoom Encoder		CH1	Channel 1 (Odd Field)
	BM	Balance Modulator		CHR	Character
	BQUIET	Bus Out Control Signal		CHR BACK	Character Back-up
	BUF IN/OUT	Buffer In/Out		CHR MIX	Character Mix
	B-Y KB	B-Y Carrier Balance		CI, CO	Buffer In/Out
	B-YO	B-Y Signal Out		CI,CO	Buffer Input & Output
C	C A In/Out	Pre-Aperture In/Out		CIF	Control Signal Forward Input
	CAPSTP	Capstan Stop Flag		CIF, CIR	Positive Control Pulse, Negative Control Pulse
	C CNT	Colour Control		CIR	Control Signal Reverse Input
	C SYNC	Composite Sync Signal		CK	Clock
	C/N	Carrier/Noise		CL/CLK	Clock
	C0-7, C00-07	Chrominance Signal 0-7		CLASS	Classeffication Signal for Compress (DCT/VLC)
	CAGAIN	Aperture Gain Control		CLASS 0.1	Class Control Signal Durring DCT/VLC
	CAM	Camera		CLK135	13.5MHz System Clock
	CAM CLK	Camera Clock		CLK18	18MHz System Clock
	CAM RST	Camera Reset		CLK2	Clock 2 (824XFH: 12.875MHz)
	CAM SIOC	Camera Serial In/Out Contol		CLK246	24.576MHz Clock
	CAM T	Camera Test		CLK27	27MHz System Clock
	CAM TL	Capstan Trque Limit		CLK450	450KHz Clock
	CAP EC	Capstan Trque Control		CLKDCLK	Digital Clock
	CAP P(H)	Capstan Power On (H)		CLK-PH	Clock Phase Control
	CAP R/F/S	Capstan Reverse (H)/Stop (M)/Forward (L)		CLK-REF	Reference Clock
	CAP SW	Capstan Power Control Switch		CLP-RST-H	Clamp Reset High Signal
	CAPSTP H	Capstan Stop Flag (Stop High)		CLX	TFT X-axis Transmission Clock
	CAPVM	Capstan Motor Current		CLX, CLX1-4	Shift Clock for X Direction (LCD Panel)
	CAPVS	Capstan Motor Power Control Switch		CLY	Shift Clock for Y Direction (LCD Panel)
	CAS	Compresion, Audio Process, Shuffling/Deshuffling		CLY	TFT Y-axis Transmission Clock
	CAS	Memory Address Strobe (Active Low)		CLY FG	Cylinder FG Signal
	CASDOWN, DWN	Cassette Down (L)		CMEMO0-3	Chroma Memory Output Signal 0-3
	CB, CR	Chroma B, Chroma R		CMIX	Character Mix
	CBLK	Composite Blanking Pulse		CMO	Chrominance Memory Output
	CC	Channel Cording		COMPC	Position Detection Pulse
	CCA	Curent Drive Control		COM RDY	Serial Enable Signal
	CCA	Current Control Amp		CMODE	Camera Mode
	CCD	Charge Coupled Devise		CNCLK	Clock
	CCW	Counterclockwise		CNR	Chrominance Noise Reduction
	CD SP0-7	Digital Chroma		CNT, CONT	Control
	CDS	Correlate Double Sampling Signal		CO	Control Out
	CDS1, 2	Sampling Pulse for CCD Output Signal		CO0-7	Chrominance Output 0 to 7 (Digital)
	CE	Chip Enable		COM	Common
	CE	Control Pulse Erase		COM RDY	Serial Transmission Enable
	CEC	Capstan Error Code		COMB	Comb Filter
	C-ERA(H)	Control Erase (H)		COS EQ	Cosin Equalizer
	CFEM	Chrominance Memory Signal		CP	Clamp Pulse
	CFM	Chrominance Field Memory		CP ON(H)	Camera Power On(H)
	CFM1-4	Chroma Field Memory Signal		CP2, 20	Clamp Pulse
	CG CLK	Character Generator Clock		CP2A, CP2O	Encoder Clamp Pulse
	CG CLK DATA	Clock Generator Data		CPN	Component Signal
	CG DATA	Character Generator Data		CPOB	Clamp Pulse for Optical Blanking
	CGC	Chrominance Gain Control		CPS	Composite Signal
	CGCS	Character Generator Chip Select		CPV	Gate Scan Clock
	CGO	Character Generator Serial Data		CR OUT	Pre Apature Out
	CH	Charge		CR POW SW	Camera Remote Power On Switch
				CRA	Aperture Gain Control

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	CRA	Pre Apature Gain Control		DISCS	Dis Chip Select
	CRST	Camera Reset		DISP	Display
	CS	Chip Select		DL	Delay Line
	CS 0-7	Chrominance Signal Out 0-7		DOBCK	Audio A/D Converter Bit Clock
	CSEL	Clock Phase Select		DOCTL	Data Output Control Signal
	CSI 0-7	Chrominance Signal In 0-7		DODAT	Serial Data (to D/A Converter)
	CTSW	Crosstalk Switch		DOLRCK	Audio A/D Converter LR Clock
	CURR	Current		DOLRCK	L/R Clock (to D/A Converter)
	CW	Clockwise		DOMCK	Audio A/D Converter Master Clock
	CYL EC	Cylinder Motor Trque Control		DOMCK	Master Clock (to D/A Converter)
	CYL PG	Cylinder Motor PG		DQ 1-16	Memory Data
	CYL VM	Cylinder Motor Current or Power		DRAM CAS	D-RAM Colum Address Strobe
				DRAM OE	D-RAM Out Enable
				DRAM RAS	D-RAM Read Address Strobe
				DREC	AV Delayed REC Start Pulse
				DRK	Dark (LPF Switch for Auto Focus)
				DS1, 2	Double Sampling Pulse
				DSF 0-7	Data In/Out for Shaffling Memory
				DSF 0-7	Input/Output Data to Shuffling Memory (18MHz)
				DSP	Digital Signal Processor
				DSP R/B	DSP IC Rady/Busy
				DSP-48K-H	DSP IC Clock Select
				DSTB	Data Stobe Signal
				DSV	Digital Sum Variation
				DV	Digital Video
				DVB	Digital Video Broadcast
				DVC	Digital Video Cassette
				DVDD	Digital VDD
				DVIO	Digital Video Input Output
				DVSS	Digital Ground
				DX	Shift Data for X Direction (for LCD)
				DY	Shift Data for Y Direction (for LCD)
				DY	TFT Y-axis Shift Data
				DZ	Digital Zoom
D	D CLK	Digital Clock			
	D MODE	Digital Mode Switch Signal			
	D01-03	Zoom 01-03			
	DA UV SEL	D/A Converter U/V Select			
	DAC	Digital Analogue Converter			
	DAG	Digital Analogue Ground			
	DB0-7	Data 0-7			
	DB0-7	Microprocessor Data			
	DCC	DC Clamp Control			
	DCCNT	DC Control			
	DCI	Digital Channel Cording IC			
	DCLR	Digital Clear			
	DCP	Digital Clamp Pulse			
	DCS-CLK, DA	CAS & DV I/F Serial Clock			
	DC-STP1	DCS Serial Start			
	DC-STP2	DCS Serial Stop			
	DCT	Discrete Cosine Transform (Compression)			
	DCX7	Serial Data			
	DEDP 0-3	Playback Data			
	DEDR 0-3	Rec Data			
	DEMO	Demodulation			
	DEMP	A/D Converter Empahsis Control			
	DEMP	De-Emphasis			
	DFD 0-7	Encode Data In/Out Between Shaffling Memory			
	DFD0-7	Encode Input/Output Signal for Shuffling Memory			
	DIBDCK	Bit Clock			
	DICLK	Digital Clock			
	DIDAT	Serial Data			
	DIDAT	Serial Data Durring Digital Audio In			
	DIF	Digital Interface			
	DILRCK	L/R Clock			
	DILRCK	Serial Clock Durring Digital Audio In			
	DIMCK	Master Clock			
	DIMCK	Mater Clock Durring Digital Audio In			
	DIO 1-8	Data In/Out			
	DIOS	Data In/Out Select Control Signal			
	DIOS	Select Signal for Digital In/Out			
	DIS	Digital Image Stabilizer			
	DIS R/B	Digital Image Stabilizer Read (H)/Busy (L)			
	DIS R/B	DIS IC Rady/Busy			
	DIS/KAND	Digital Image Stabilizer/Sensitivity			
			E	E Snap	Electric Snap Shot
				E ZM	Electric Zoom
				E2 CS or E2P CS	EEPROM Chip Select
				E2 R/B	EEPROM Rady/Busy
				E2P	EEPROM
				EARP	Earphone
				EC	Torque Control
				ECC	Error Correction Cording
				ECM	Electric Condencer Mic
				ECR	Reference Voltage for Capstan Torque
				EDA	Error Correction, DCI, ATF Servo
				EE CS	EEPROM Chip Select
				EE R/B	EEPROM Read (H)/Busy (L)
				EEPROM	Electric Erasable Programable Read Only Memory
				EIS	Electric Image Stabilizer (DIS)
				EMP	A/D Converter Emphasis Control
				ENAB	Enable
				ENV	Enverope
				EOB	End of Block

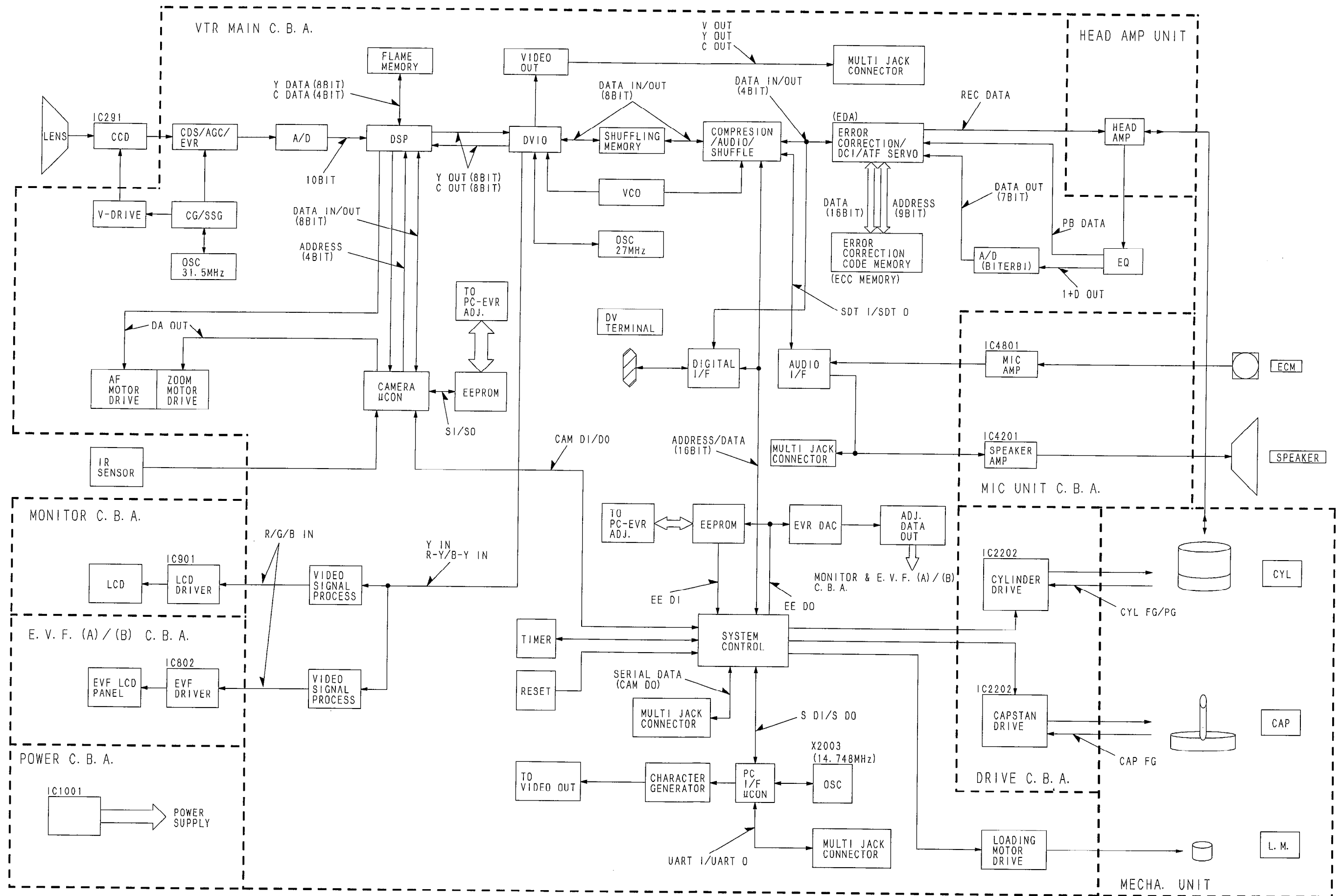
INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	EQ	Equalizer		HD	Horizontal Drive Pulse
	EVF	Electric View Finder		HDTV	High Definition TV
	EXT DC	External DC (AC Adaptor)		HEX	Hexadecimal
	EXT DC(H)	AC Adaptor DC (H)		HG	Hall Gain
	EXT NOREG	AC Adaptor 6V		HID	Head Switching Pulse
	EXT S DATA	Serial Data for Edit		HLT	High Bright Signal
	EXT SCK	Serial Clock for Edit		HALL IN(+), (-)	Input Signal from Hall IC
	EZOOM	Electric Zoom		HP	Headphone
				HPF	High Pass Filter
				HSE	Modulated Data Output
				HSP	Timing Pulse for Shuffling Memory
				HSS	Horizontal Sync Signal
				HSW	Head Switching Pulse
				HS-WT	High Speed Zoom
				HSZ	High Speed Zoom
F	F ENC	Lens F-Value	I	I/F	Interface
	FACT MODE	Factory Mode (not used in the service)		I-2 C	Inter Integrated Circuit
	FB	Feed Back		ID(H)	Wide Television (H)
	FC	Saw Tooth Signal In		IMP	Inter Microprocessor Protocol
	FCK	Clock		INF	CCD Input Signal 1
	FCO	Saw Tooth Signal Generator		INF	Input Frame Signal
	FENC	Focus Encoder		INS	CCD Input Signal 2
	FEND	Frame End Pulse		INTER	Interval Recording
	FH2B	FH/2 (15.625KHz / 2=7.8125KHz)		INV	Inverter
	FIX OSD	Auto Tracking Off (H)		IOU	R-Y Analogue Signal Output
	FLICK	Flicker Output		IOV	B-Y Analogue Signal Output
	FM	Field Memory		IOY	Y Analogue Signal Output
	FM0-7	Field Memory 0-7		IR	Infrared Rays
	FMCO0-3	Field Memory Chrominance Out 0-4		IRDET	Infrared Ray Detection
	FMDIR	Focus Motor Direction		IREF	Current Adjustment Terminal
	FMOEM	Field Memory Enable		IRIS/SH	Iris / Shutter Control
	FMOEO	Field Memory Enable		IRQ	Interrupt Request
	FMT1-4	Focus Motor Terminal 1-4		ITI	Insert & Track Information
	FMY00-07	Field Memory Luminance Out 0-7			
	FMY10-07	Field Memory Luminance In 0-7			
	FNO	F Value			
	FPS	Frame Reference Signal			
	FR	Capstan Reverse High			
	FRP	Frame Reference Pulse			
	FRPSO	Frame Start Pulse			
G	G1, G2, G3	Gap 1, 2 and 3	J	JPEG	Joint Photographic Image Coding Experts Group
	GCA	Gain Control AMP			
	GCNT	Gain Control	K	KANDO	Digital Gain Up
	G-CNT	AGC Adjustment		KB	Carrier Balance
	GCTRL	Gain Control		KEY IN	Key Scan
	GENE	Generator		KND	Digital Gain Up
	GF	FG AMP Terminal		KNEE	Luminance Compensate
	GSW	Ground for Switching Power			
H	H/M/N	Hi-Fi / Mix / Normal	L	LCD	Liquid Crystal Display
	H/N	Hi-Fi / Normal		LCD P(L)	LCD Power On (L)
	H1, 2	H. CCD Drive Pulse		LD	Load Pulse
	HAP	Horizontal Aperture		LDD	Liquid Direct Drive
	HASW	Head AMP Switching Pulse		LEDCNT	LED Control
	HB	Hall Bias		LI-BATT	Lithium Battery
	HBR SET	High Brightness Set		LOAD	Loading
	HBRST	High Brightness Set		LOAD F, R	Loading Direction (F: Forward / R: Reverse)
	HCLR	High Clear		LPF	Low Pass Filter
	HCP	Shift Clock for Horizontal Drive		LRMONO	Monoral Audio (L + R)
				LSB	Least Significant Bit

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	LVL	LPF Switch for Auto Focus	P	P SW	Power Switch
M	M1-3	Motor Coil Terminal 1 to 3		PB1-3	PNP Base 1-3
	MA0-5	Microprocessor Address Data 0-5		PBCTL	Play Back Control
	Mbps	Megahertz Bit Per Second		PBCTL	Pre-Blanking Control
	MD	Modulation		PBH	Head Amp Switch
	MD0-7	Microprocessor Data 0-7		PBLK	Pre-Blanking (Pulse)
	MDT0-7	Microprocessor Data 0-7		PC1-3	Corrector of PNP Transistor
	ME (TAPE)	Metal Evaporated (Tape)		PCBM	Carrier Balance
	MENB	Focus Motor Enable		PCH	Phase Compensator (Hall AMP)
	MFF	Manual Focus Far		PCI	Phase Compensator (Current)
	MFN	Manual Focus Near		PCO	Phase Compensator Out
	MHSYNC	Monitor Horizontal Sync Signal		PCS	Switching Power Control
	MIC	Memory In Cassette		PCV	Phase Compensator (Voltage)
	MIG	Meta In Gap		PE	Emitter of PNP Transistor
	MIX N.R.D.	Non Rec Data Mix		PED	Pedestal
	MOD	Modulation		PEDECNT	Pedestal Control
	MOUT	Mic Out		PENO	Alarm (L)
	MP (TAPE)	Metal Particle (Tape)		PFP	Pilot Frame Position
	MPEG	Moving Picture Image Cording Experts Group		PGA, B	Power Ground A, B
	MPEG2	Moving Picture Image Cording Experts Group Phase 2		PGC	Pulse Generator Comparator
	MRST	Focus Motor Reset		PGI	Pulse Generator Input
N	MSB	Most Signal Bit		PGMM	Pulse Generator Monostable Multivibrator
	MVSYNC	Monitor Vertical Sync Signal		PGO	Output of Pulse Generator AMP
	N/F	Near/Far Focus		PMODE	Select Signal for Normal / Wide Screen
	N/P	NTSC/PAL		PON	Power On
	NB1-3	Base for NPN Transistor		POR	Power On Reset
	NC	No Connection		POSCOM	Common Position
	NC1-3	Corrector of NPN Transistor		PREAMP	Pre-AMP
	NCLR	Power On Reset		PREBLK	Pre-Blanking
	NCP1	Clamp Pulse		PT	Protect for V Voltage
	NCP2+VDH	Clamp Pulse + Horizontal Drive Pulse		PWM	Pulse Width Modulation
	NCP2+VDM	Clamp Pulse + Gate Pulse		PWMB	Pulse Width Modulation Pulse
	NDE	Non Liner De-Emphasis	Q	Q2H	Source Output Select
	NE	Emitter of NPN Transistor	R	R CTL P	Recorded Control Pulse (+)
	NLE	Non Liner Emphasis		R CTL R	Recorded Control Pulse (-)
	NR	Noise Reduction		R/B	Read/Busy
	NRD	Non Rec Data		R/L	Direction Control for Data Transmission
	NRD BLK	Non Rec Data Blanking		RA	Recording AMP
	NRD CLK	No Rec Data Clock		RA1	Rec AMP 1
	NRE	Read Enable Input (Low Active)		RAC AC	Rec Audio Current
	NWE	Write Enable (Low Active)		RAD	Read Address Data
O	OB	Optical Black		RAE	Read Address Enable
	OBCNT	Optical Black Control		RB	Read Busy
	OBREF	Reference Voltage for Optical Black Control		R-B	R Bias
	OE	Output Enable		RCB	R Carrier Balance
	OFH	Horizontal Counted Down Clock Signal (Reference)		RE	Read Enable
	OFS	Offset		RE(F), (S)	Rotary Erase Head Transformer
	OP	Operation AMP Output		REB	R Bias
	OSD	ON Screen Display		REC CC	Rec Current Control
	OVL	Overlap Pulse		REC CCNT	Rec Current Control
	OZ	Optical Zoom		RECCTRL	Recording Control Pulse
				RECI	Rec Amp Switch

INITIAL/LOGO		ABBREVIATIONS		INITIAL/LOGO		ABBREVIATIONS	
	RENCF	Lens Control (Forward)			SWB	Switching Pre-Drive Pulse	
	RENCR	Lens Control (Reverse)			SYL EC	Cylinder Torque Control	
	RERASE	Rotary Erase Head			SYL FG	Cylinder FG	
	RGBIV1-2	1V Inverted Signal 1-2					
	RGO R/G OFF	Offset Voltage for AWT R					
	RSF	Capstan Direction (Reverse / Stop / Forward)		T	T PHOT	Take-up Photo Transistor	
	RST	Reset			TBC	Time Base Control	
	RSTB	R Strobe			TFT	Thin Film Transistor	
	RSTPWD	Reset Power Down Input			TH	Thermostat for Battery	
	RSTR	Reset Read			TI	Test Mode Select	
	RSTW	Reset Write			TL	Torque Limit	
	RT	Saw Tooth Terminal			TM	Sub Code	
	RVCO	Resistor for Oscillation			TMD	Sub Code Data	
	RW	Read Write			TRE	Tracking Error Signal	
	RWAE	Read Write Enable			TREEL(P)	Take-up Reel (Pulse)	
					TRFIX	Tracking Fix	
					TRIWAVE	Tracking Wave	
					TRP	Tracking Position	
					TRP	Trap	
					TSR	Head Switching Reference	
					TST	Time Scale Transfer	
S	S PHOT	Supply Photo Transistor		U	U/V SEL	R-Y/B-Y Select Signal	
	S/H	Sampling Hold			UNLOAD	Un-Loading	
	S/S	Start/Stop			UNRE	Microprocessor Read Enable	
	SBD	Serial Data			UNWE	Microprocessor Write Enable	
	SBI	Serial Data Input			UV	R-Y/B-Y	
	SBO	Serial Data Output			UV SEL	R-Y/B-Y Select Signal	
	SBT	Serial Clock					
	SCAN0-5	Key Scan 0-5					
	SCK	Serial Clock					
	SCR	Search					
	SCR, S.C.R.	Still Cue Review					
	SEG.	Segment					
	SET	White Balance Set		V	V1-V4	V. CCD Drive Pulse	
	SH/IRIS	Shutter/Iris Control			VB	VH Filter Switching	
	SHIFT	Capacitor for Phase Shift			VCE	Power Terminal	
	SI	Serial Data Input			VCNTL	Video Control	
	SIC	Shift In Clock Input			VCO	Voltage Control Oscillator	
	SIOC	Serial In/Out Control			VCP	Shift Clock Output for Vertical Drive	
	SMCE	Shuffling Memory Chip Enable			VCTLD	Video Control	
	SMRS	Shuffling Memory Read Strobe			VCTRL	Voltage Charge Control	
	SMWE	Shuffling Memory Write Enable			VD	Vertical Drive Pulse	
	SMWS	Shuffling Memory Read Strobe			VDDX	X Drive Power for Colour LCD	
	SNAP	Snap Shot			VDDXY	XY Drive Power for Colour LCD	
	SNS LED	Sensor LED			VDDY	Y Drive Power for Colour LCD	
	SO	Serial Data Output			VDREC	Video Delayed Rec	
	SPA	ATF Sampling Pulse			Vgg	Voltage for Gate IC	
	SPEN	8 Bit Shift Register Enable			Vgl	Gate off Voltage	
	SPK	Speaker			VID	Video Signal Out	
	SPO	Reset for Switching Power			VIN	Video In	
	SPST	8 Bit Shift Register Strobe			VITC	Vertical Interval Time Code	
	SREELP	Supply Reel Pulse			VITERBI	One of Signal Detection Method	
	SRT	Start			VL	Low Voltage	
	SSA	Start Sync block Area			VLC	Variable Length Coding	
	SSW	Select Signal for Low Pass Filter			VLOCKP	Artificial Sync Pulse	
	ST5V	Safety Tab 5V			VLP	Artificial Sync Pulse	
	STAB	Safety Tab Switch			VM	Motor Voltage	
	STB	Stand by Signal			VMD	Velocity Mode Data	
	STB	Strobe			VMD1-3	Electric Shutter Mode	

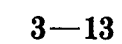
INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	VMODE	NTSC/PAL Select Switch			
	VMVH	VH Filter Switching			
	VORP	Video Overlap			
	VRB	Voltage Reference Bottom			
	VRBS	Voltage Reference Bottom Output			
	VREF1R3V	Reference Voltage 1.3V			
	VREF3R3V	Reference Voltage 3.3V			
	VREFH	Reference Voltage High Side			
	VREFL	Reference Voltage Low Side			
	VRI	Reference Voltage Input			
	VRO	Reference Voltage Output			
	VRT	Voltage Reference Top			
	VRTS	Voltage Reference Top Output			
	VS	Switching Comparator			
	VSS	Vertical Sync Signal			
	VSSX	X Driver Power for Colour LCD			
	VSSXY	X-Y Driver Power for Colour LCD			
W	W/N	Mode Select for Window Mode			
	W/N	Wide / Normal			
	WAD	Write Address Enable			
	WAE	Write Address Enable			
	WAERAE	Write Address Enable			
	WARI	Interrupt			
	WB	White Balance			
	WE	Write Enable			
	WEM	Memory Write Enable			
	WHD	Wide Horizontal Drive Pulse			
	WIDE A	Wide Zoom			
	WSB	B AGC Control			
	WSR	R AGC Control			
	WTV	Wide TV			
X	XP	FG Logic Reset			
Y	Y FM0-7	Y Field Memory 0-7			
	YCE	Cylinder Error Code			
	YGC	Y Gain Control			
	YMO 0-7	Y Field Memory 0-7			
	YNCST	Noise Canceller			
	YNR	Luminance Noise Reduction			
	YSDP 0-7	Digital Y Out 0-7			
Z	Z.ENC	Zoom Encoder			
	Z.MIC	Zoom Mic			
	ZENC	Zoom Encoder Output			
	ZMDIR	Zoom Drive			
	ZMEN	Zoom Enable			
	ZMT	Zoom Motor Tele Side			
	ZMT (+)/(-)	Zoom Motor (+)/(-)			
	ZMTER	Zoom Motor Tele Side			
	ZMW	Zoom Motor Wide Side			
	ZSW	Zoom Switch			

3-2. OVERALL BLOCK DIAGRAM

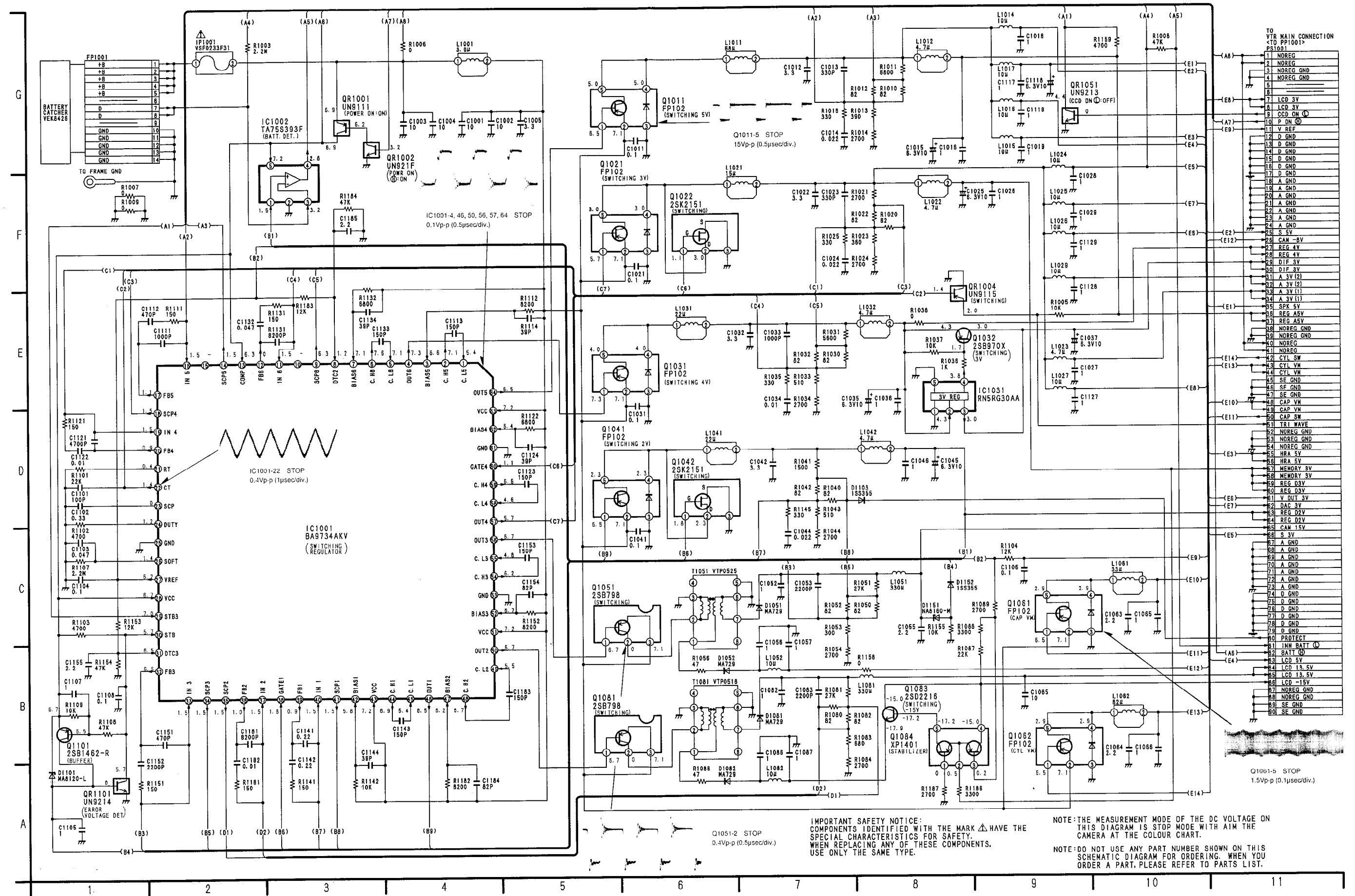


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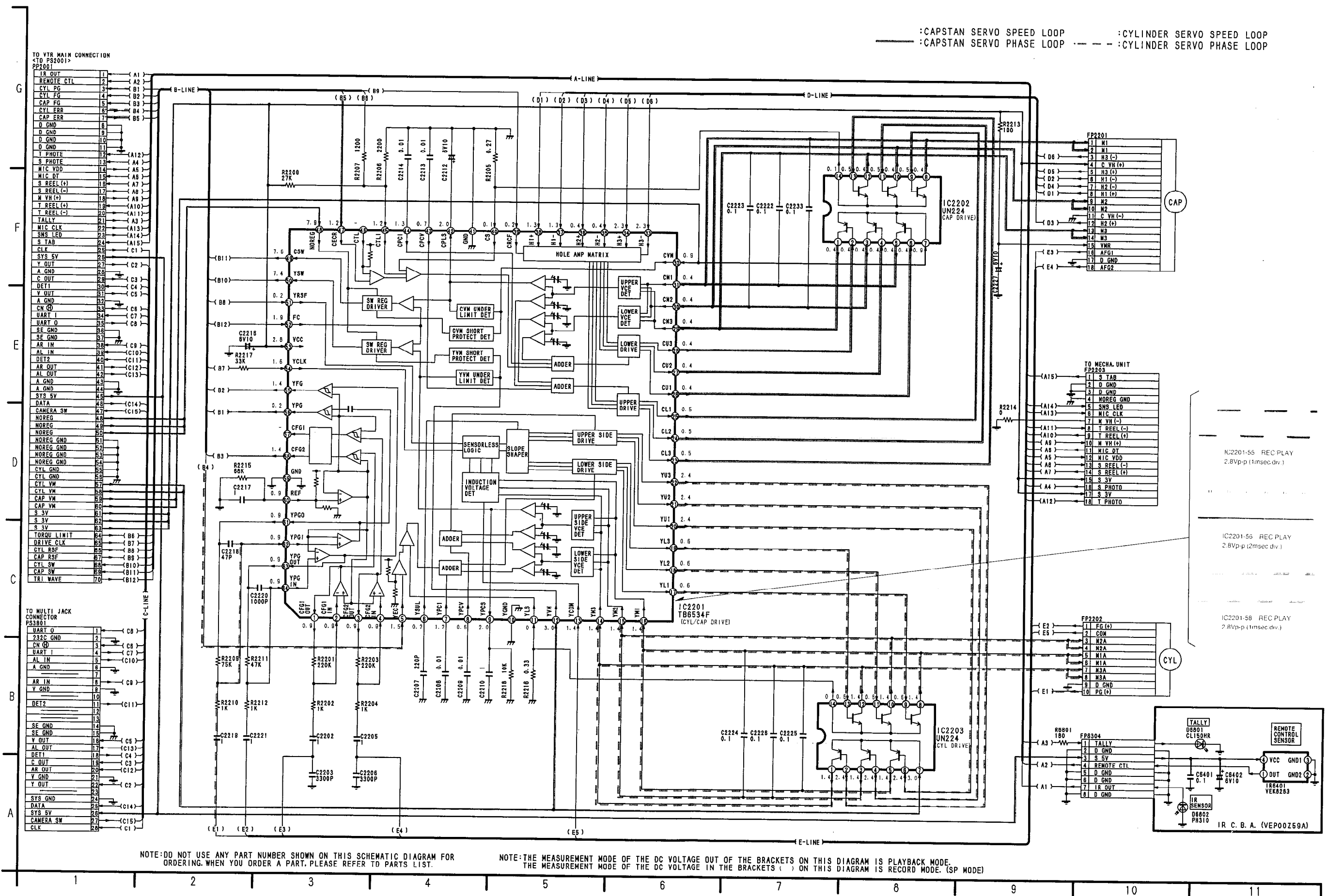




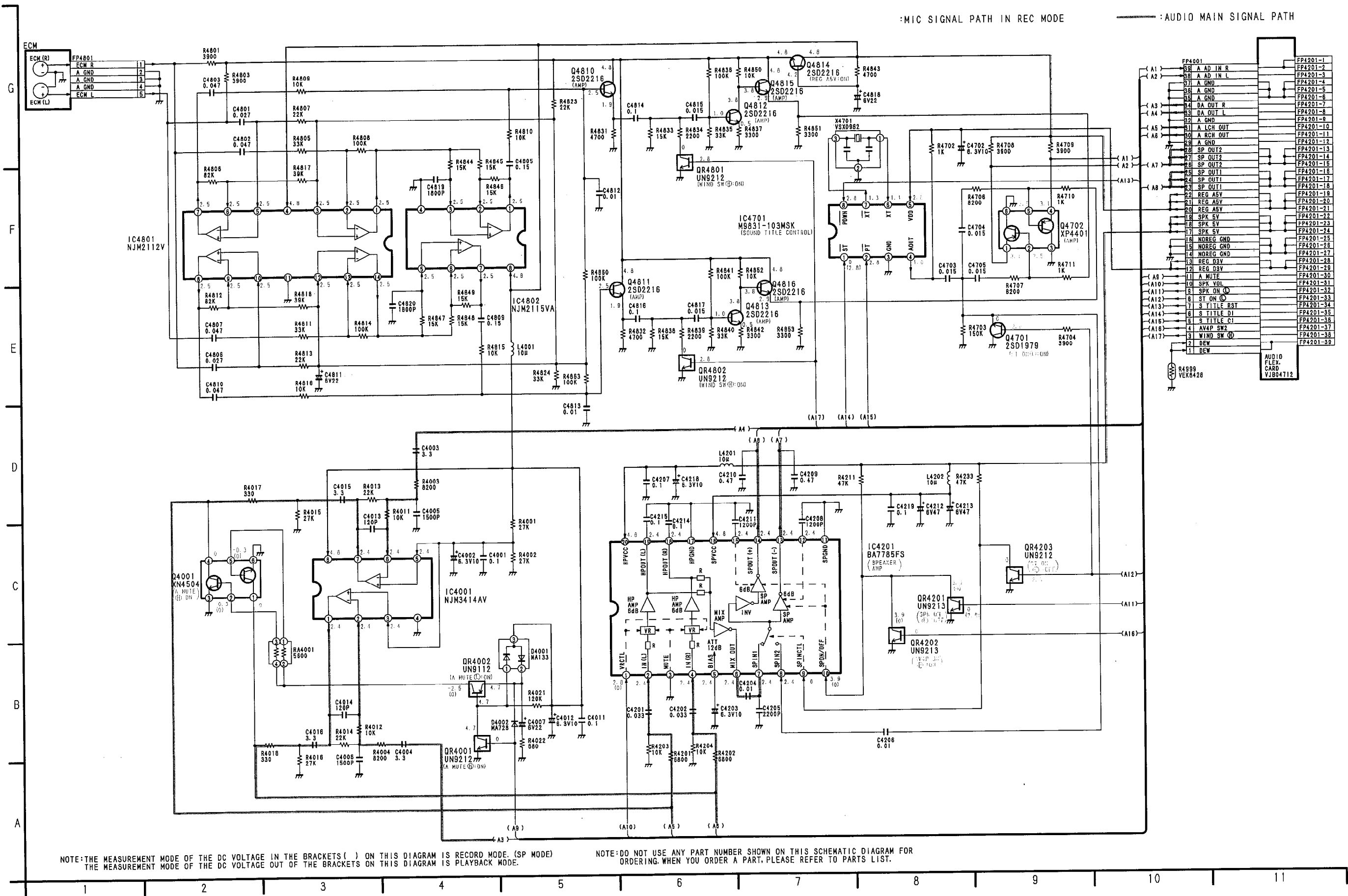
3-4. POWER SCHEMATIC DIAGRAM



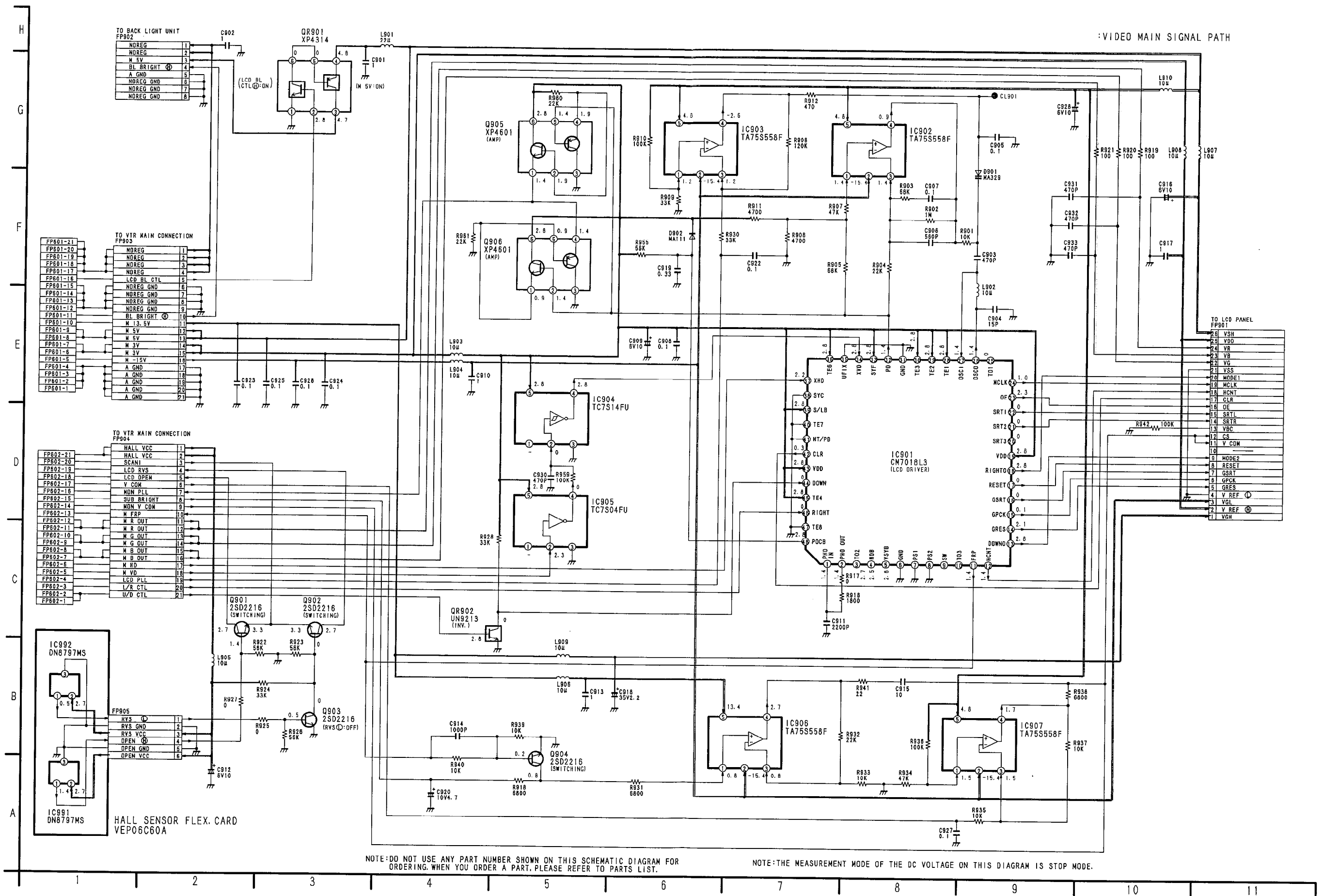
3-5. DRIVE & IR SCHEMATIC DIAGRAM



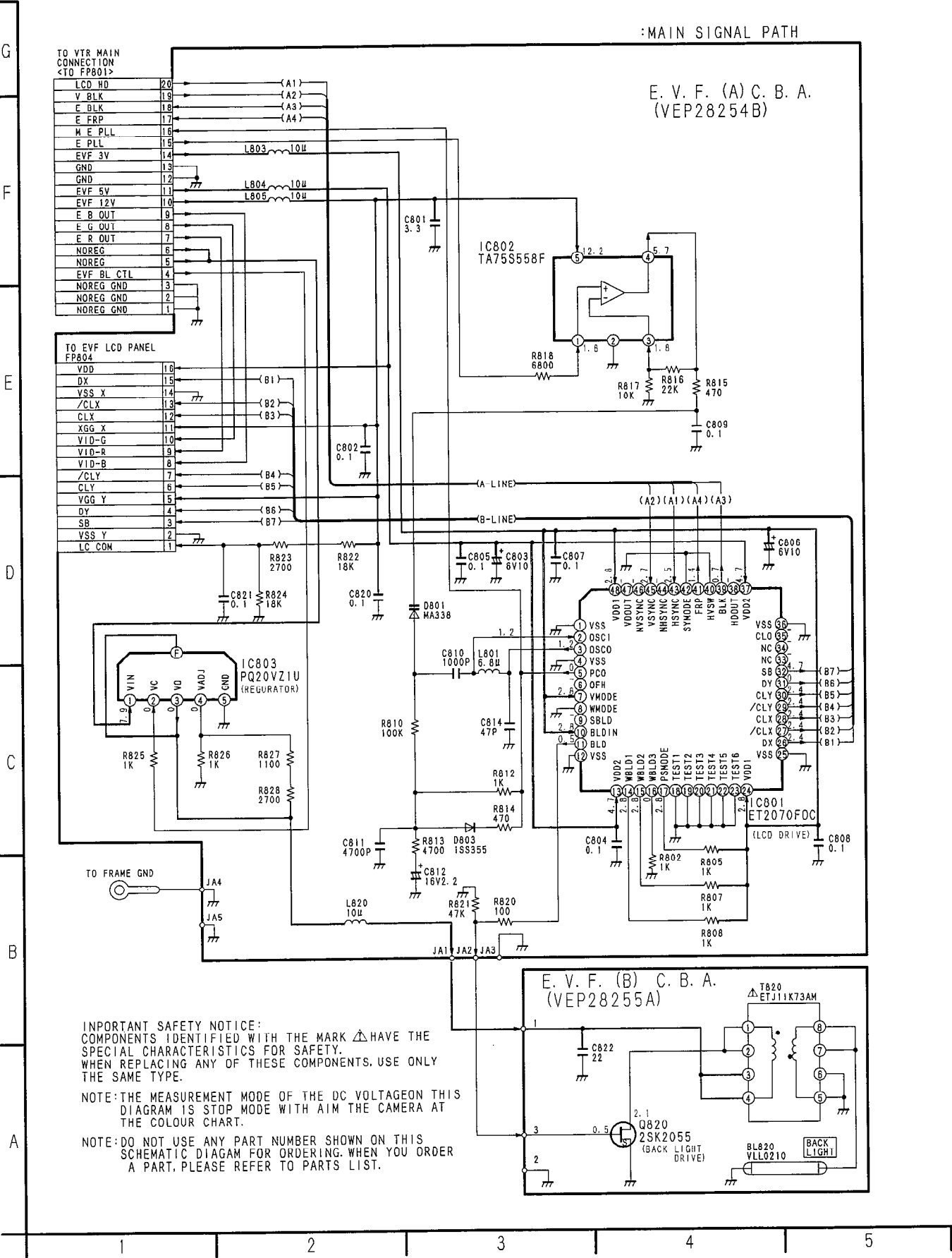
3-6. MIC UNIT SCHEMATIC DIAGRAM



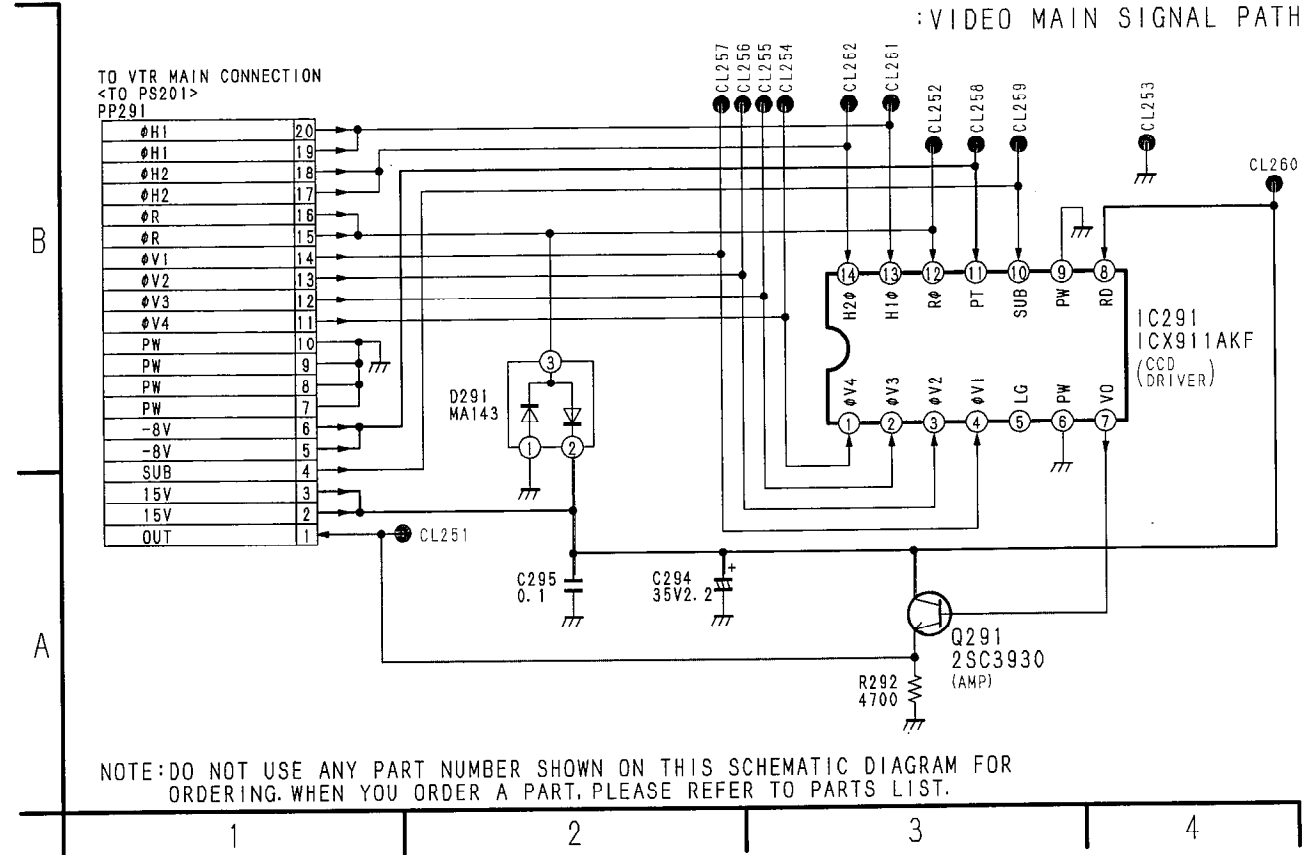
3-7. MONITOR & HALL SENSOR FLEX. CARD SCHEMATIC DIAGRAM



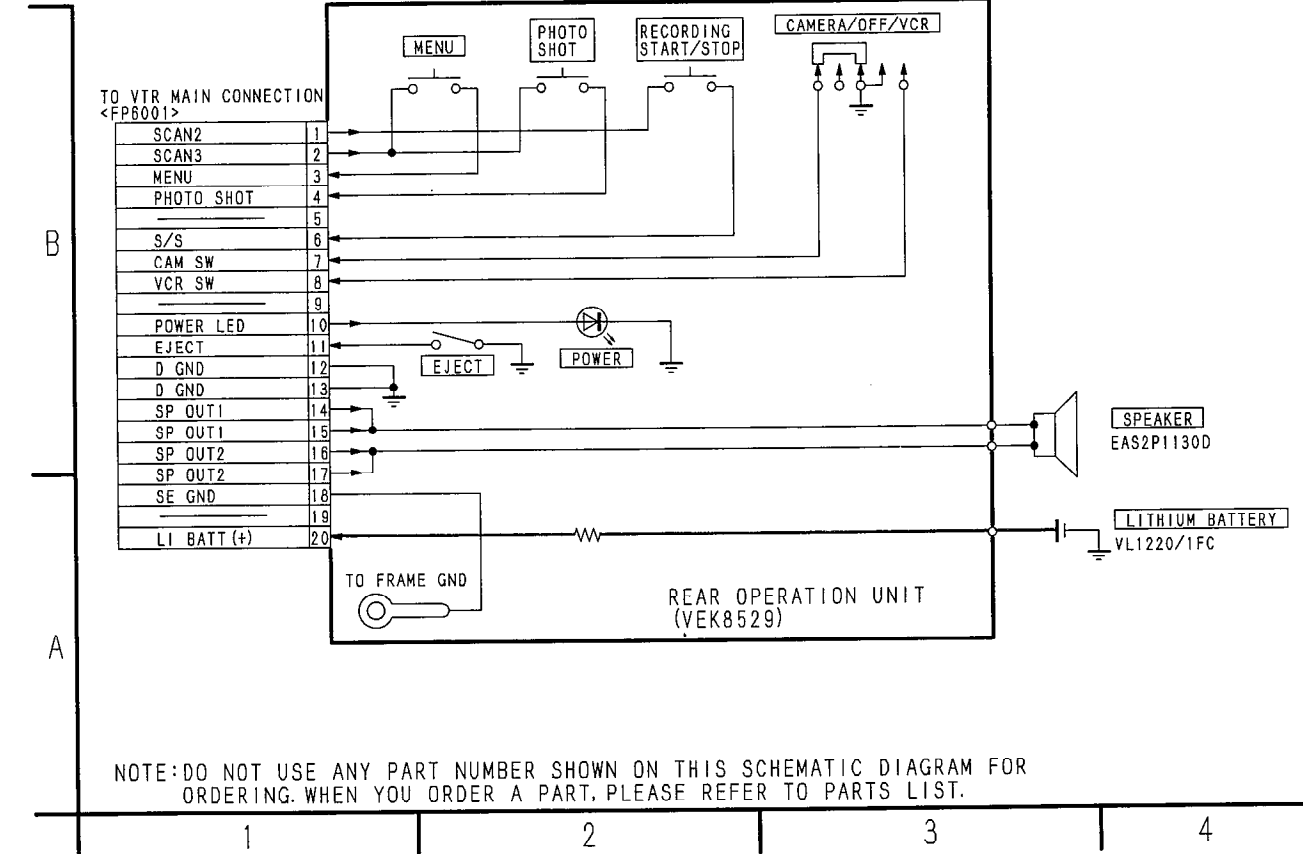
3-8. E.V.F. (A) & E.V.F. (B) SCHEMATIC DIAGRAM



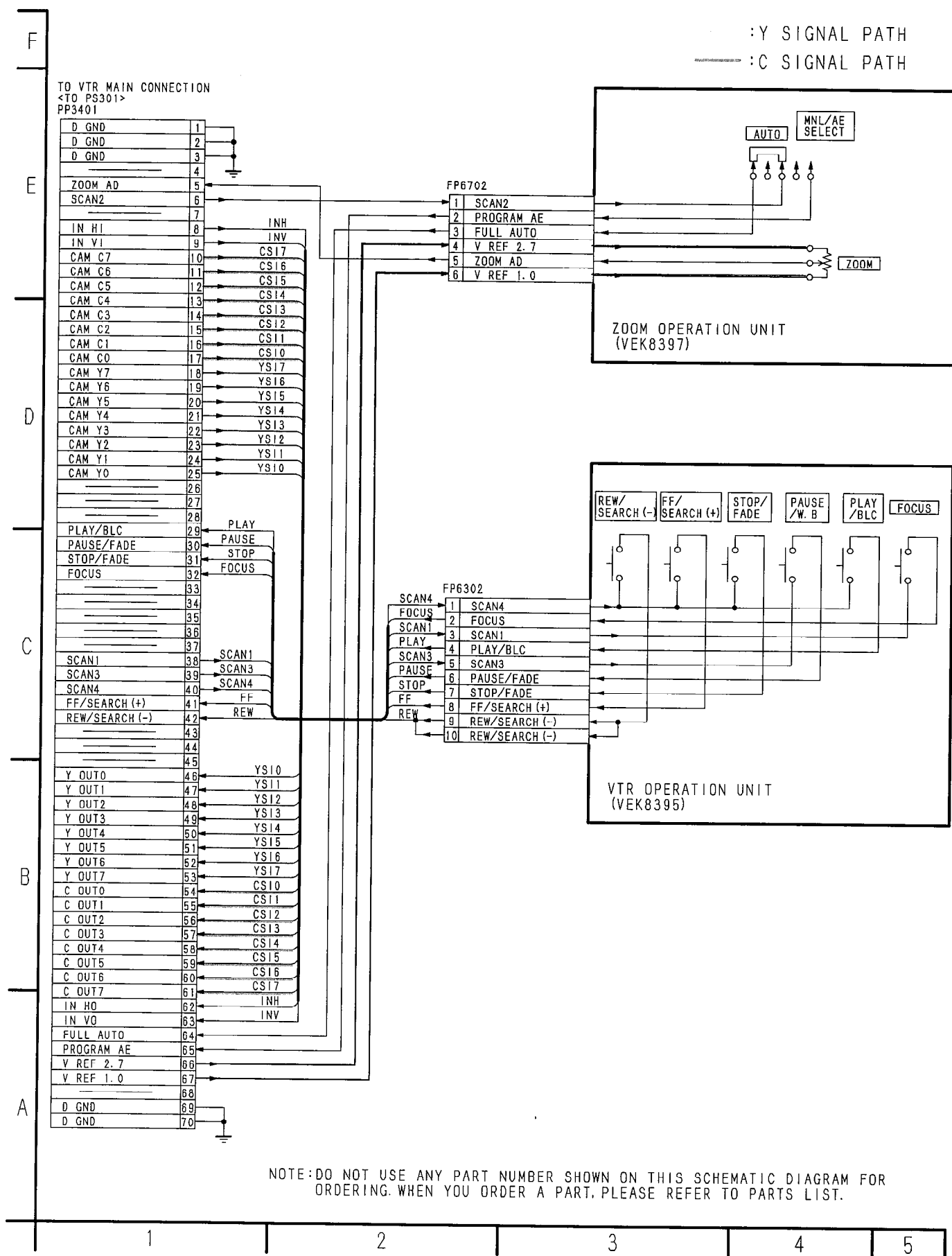
3-9. CCD FLEX. CARD SCHEMATIC DIAGRAM



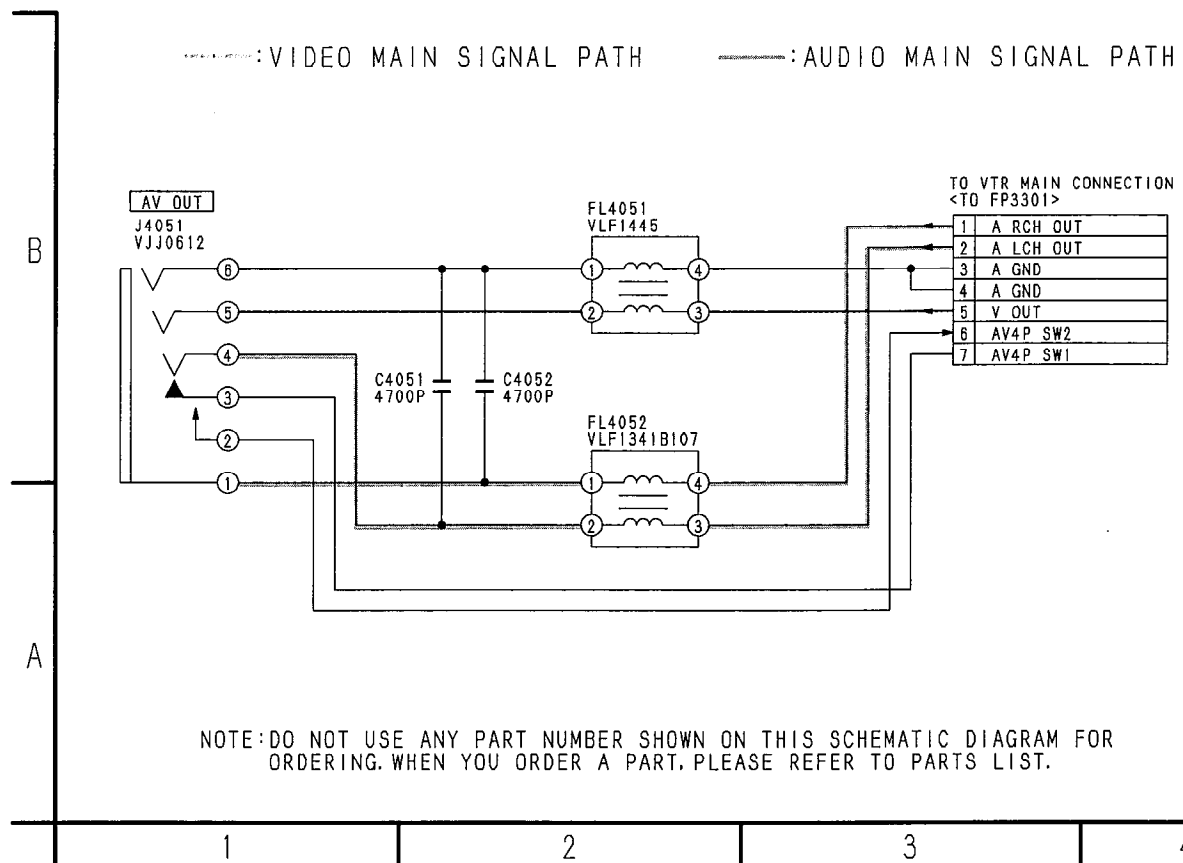
3-10. REAR OPERATION UNIT SCHEMATIC DIAGRAM



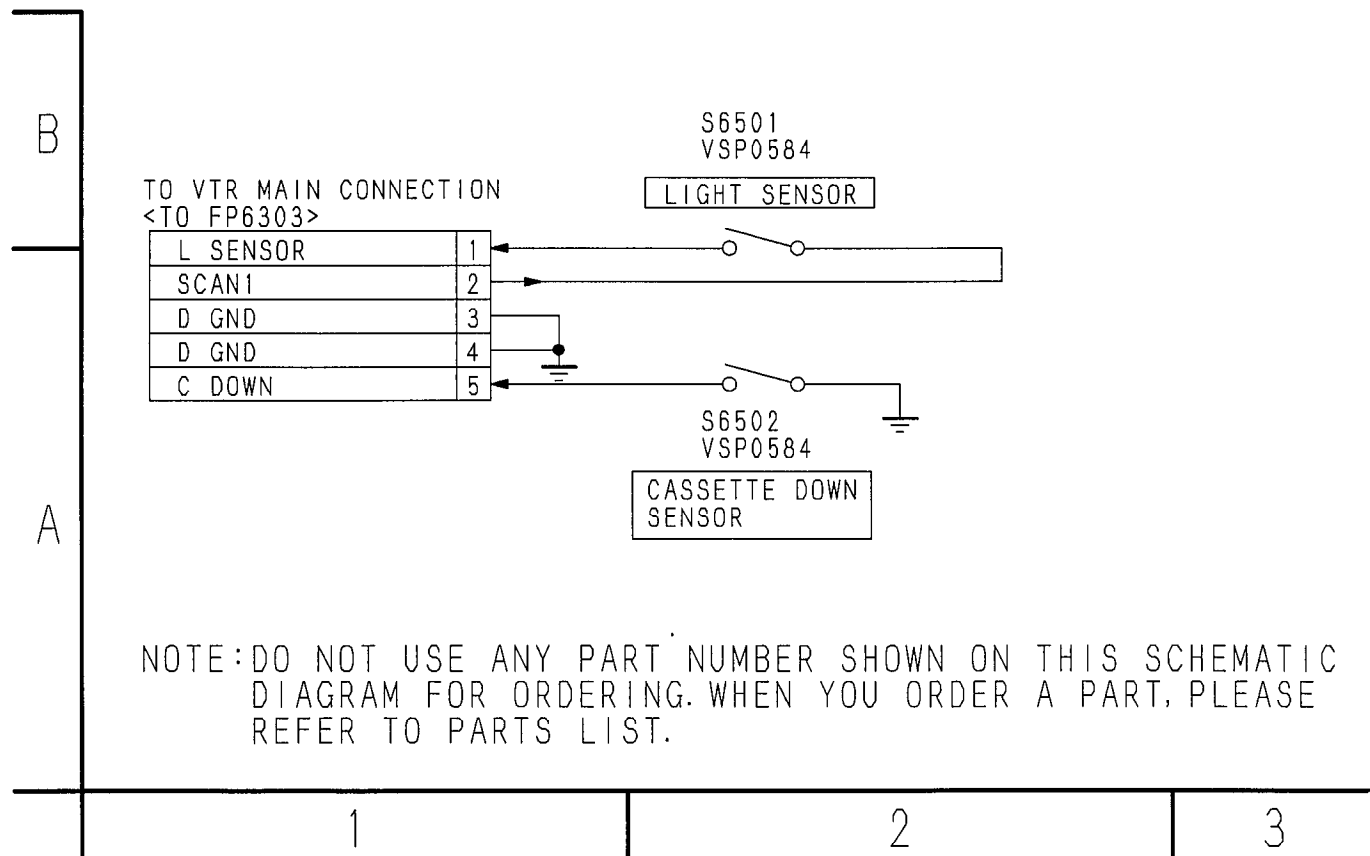
3-11. OPERATION I/F SCHEMATIC DIAGRAM



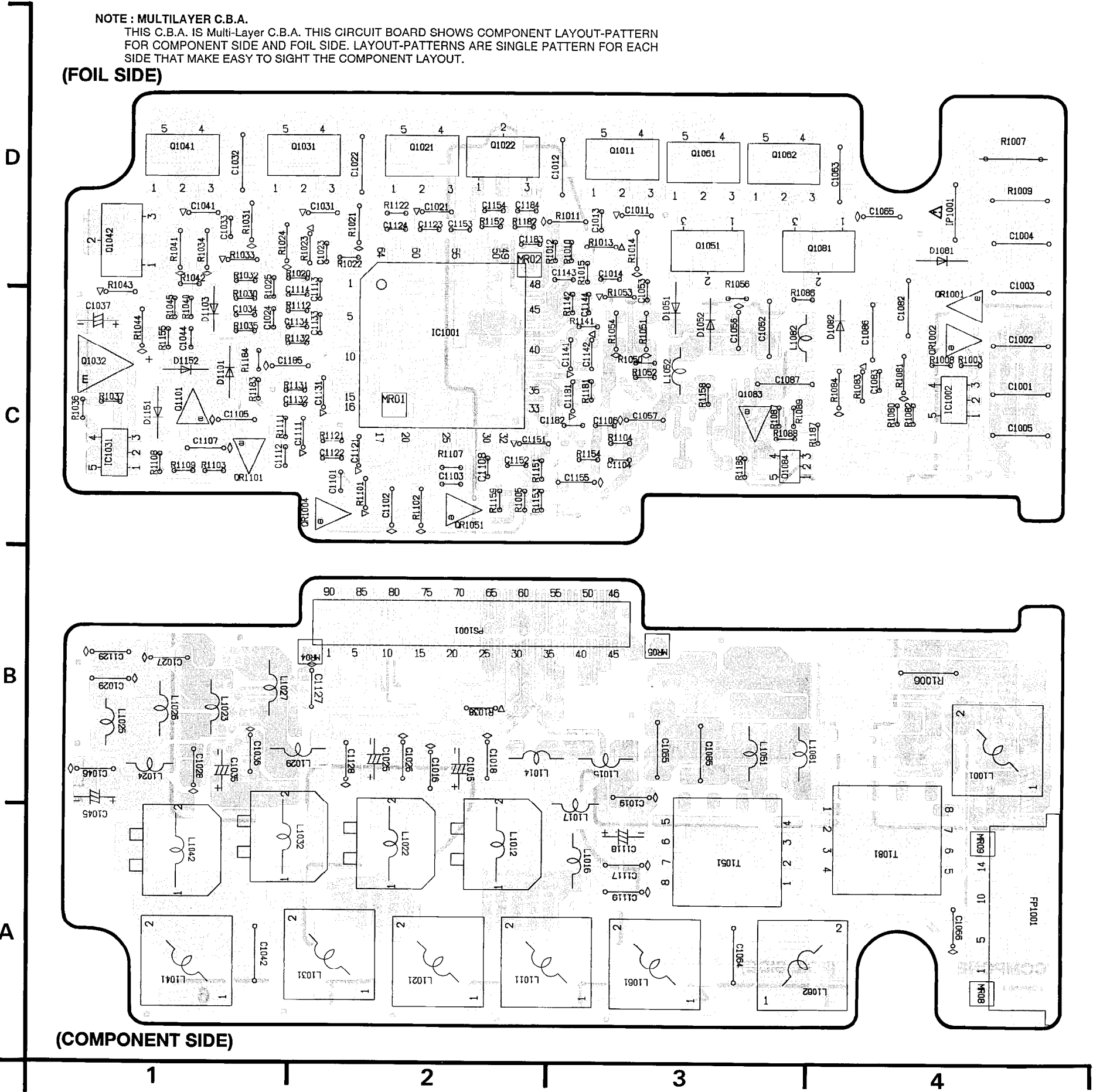
3-12. AV JACK SCHEMATIC DIAGRAM



3-13. CASSETTE DOWN FLEX. CARD SCHEMATIC DIAGRAM



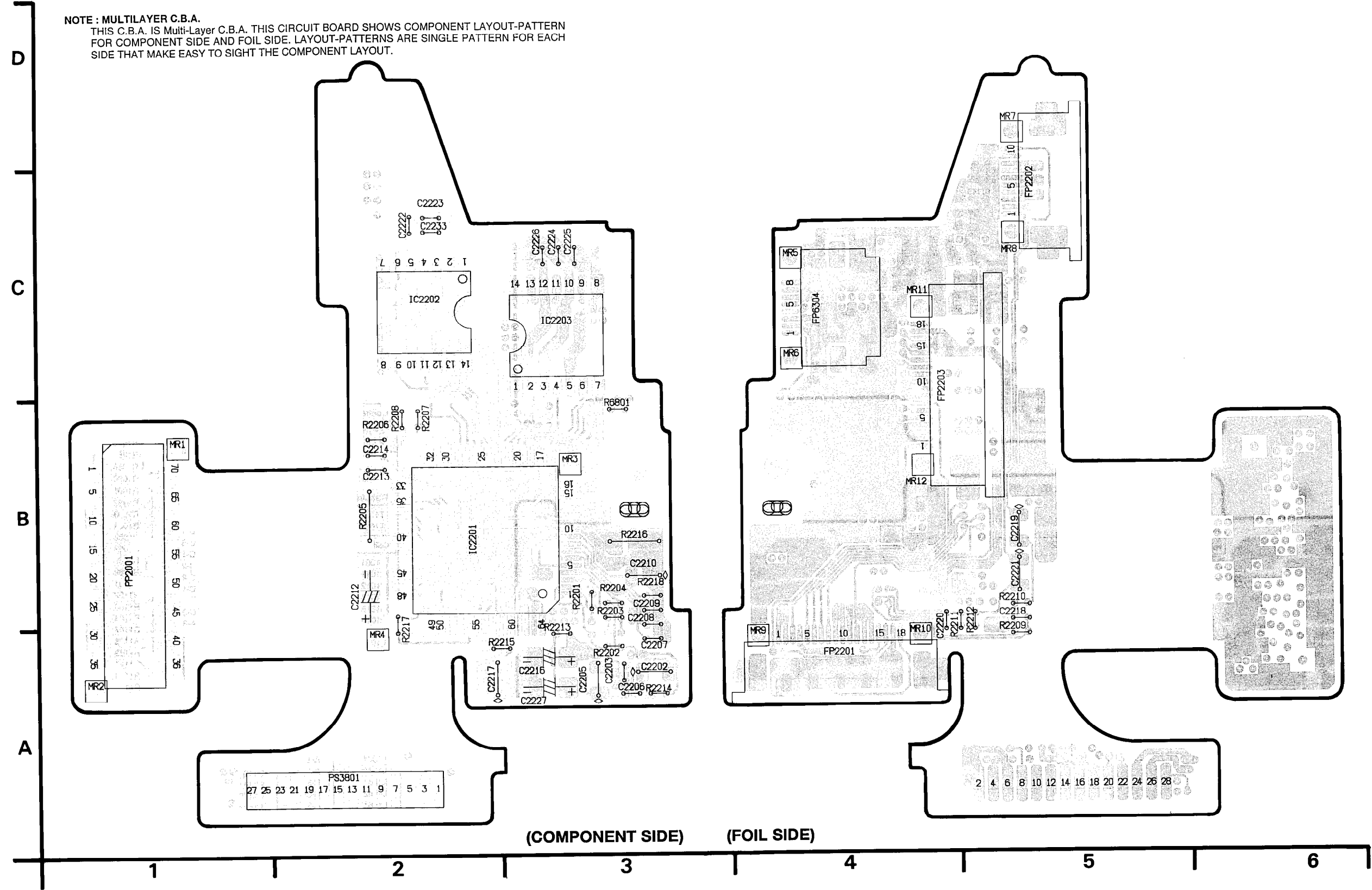
3-14. POWER C.B.A. (VEP01827B)



POWER C.B.A.				
Integrated Circuit		C1005	C-4	C1184
IC1001	C-2	C1011	D-3	C1185
IC1002	C-4	C1012	D-3	Resistor
IC1003	C-1	C1013	D-3	
Transistor		C1014	D-3	R1003
Q1011	D-3	C1015	B-2	R1005
Q1021	D-2	C1016	B-2	R1006
Q1022	D-2	C1018	B-2	R1007
Q1031	D-2	C1019	B-3	R1008
Q1032	C-1	C1021	D-2	R1009
Q1041	D-1	C1022	D-2	R1010
Q1042	D-1	C1023	D-2	R1011
Q1051	D-3	C1024	C-1	R1012
Q1061	D-3	C1025	B-2	R1013
Q1062	D-3	C1026	B-2	R1014
Q1081	D-4	C1027	B-1	R1015
Q1083	C-3	C1028	B-1	R1020
Q1084	C-3	C1029	B-1	R1021
Q1101	C-1	C1031	D-2	R1022
Transistor & Resistor		C1032	D-1	R1023
QR1001	C-4	C1033	D-1	R1024
QR1002	C-4	C1034	C-1	R1025
QR1004	C-2	C1035	B-1	R1030
QR1051	C-2	C1036	B-1	R1031
QR1101	C-1	C1037	C-1	R1032
Diode		C1041	D-1	R1033
D1051	C-3	C1042	A-1	R1034
D1052	C-3	C1044	C-1	R1035
D1081	D-4	C1045	A-1	R1036
D1082	C-4	C1046	B-1	R1037
D1101	C-1	C1052	C-3	R1038
D1103	C-1	C1053	C-3	R1039
D1151	C-1	C1055	B-3	R1040
D1152	C-1	C1056	C-3	R1041
Connector		C1057	C-3	R1042
FP1001	A-4	C1063	D-4	R1043
PS1001	B-2	C1064	A-3	R1044
IP		C1065	D-4	R1045
IP1001	D-4	C1066	A-4	R1050
Transformer		C1082	C-4	R1051
T1051	A-3	C1083	C-4	R1052
T1081	A-4	C1085	B-3	R1053
Coil		C1086	C-4	R1054
L1001	B-4	C1087	C-3	R1056
L1011	A-3	C1101	C-2	R1080
L1012	A-2	C1102	C-2	R1081
L1014	B-2	C1103	C-2	R1082
L1015	B-3	C1104	C-3	R1083
L1016	A-3	C1105	C-1	R1084
L1017	A-3	C1106	C-3	R1086
L1021	A-2	C1107	C-1	R1087
L1022	A-2	C1108	C-2	R1088
L1023	B-1	C1111	C-2	R1089
L1024	B-1	C1112	C-1	R1101
L1025	B-1	C1113	D-2	R1102
L1026	B-1	C1114	C-2	R1103
L1027	B-1	C1117	A-3	R1104
L1029	B-2	C1118	A-3	R1107
L1031	A-2	C1119	A-3	R1108
L1032	A-2	C1121	C-2	R1109
L1041	A-1	C1122	C-2	R1111
L1042	A-1	C1123	D-2	R1112
L1051	B-3	C1124	D-2	R1121
L1052	C-3	C1127	B-2	R1122
L1061	A-3	C1128	B-2	R1131
L1062	A-4	C1129	B-1	R1132
L1081	B-3	C1131	C-2	R1141
L1082	C-3	C1132	C-2	R1142
Capacitor		C1133	C-2	R1151
C1001	C-4	C1134	C-1	R1152
C1002	C-4	C1141	C-3	R1153
C1003	D-4	C1142	C-3	R1154
C1004	D-4	C1143	D-3	R1155
		C1144	C-3	R1158
		C1151	C-2	R1159
		C1152	C-2	R1181
		C1153	D-2	R1182
		C1154	D-2	R1183
		C1155	C-3	R1184
		C1181	C-3	R1186
		C1182	C-3	R1187
		C1183	D-2	

ADDRESS INFORMATION

3-15. DRIVE C.B.A. (VEP02563A)



DRIVE C.B.A.	
Integrated Circuit	
IC2201	B-2
IC2202	C-2
IC2203	C-3
Connector	
FP2201	A-4
FP2202	C-5
FP2203	C-4
FP6304	C-4
PP2001	B-1
PS3801	A-2
Capacitor	
C2202	A-3
C2203	A-3
C2205	A-3
C2206	A-3
C2207	A-3
C2208	B-3
C2209	B-3
C2210	B-3
C2212	B-2
C2213	B-2
C2214	B-2
C2216	A-3
C2217	A-2
C2218	B-5
C2219	B-5
C2220	A-4
C2221	B-5
C2222	C-2
C2223	C-2
C2224	C-3
C2225	C-3
C2226	C-3
C2227	A-3
C2233	C-2
Resistor	
R2201	B-3
R2202	A-3
R2203	B-3
R2204	B-3
R2205	B-2
R2206	B-2
R2207	B-2
R2208	B-2
R2209	A-5
R2210	B-5
R2211	A-4
R2212	A-5
R2213	A-3
R2214	A-3
R2215	A-2
R2216	B-3
R2217	A-2
R2218	B-3
R6801	B-3

ADDRESS INFORMATION

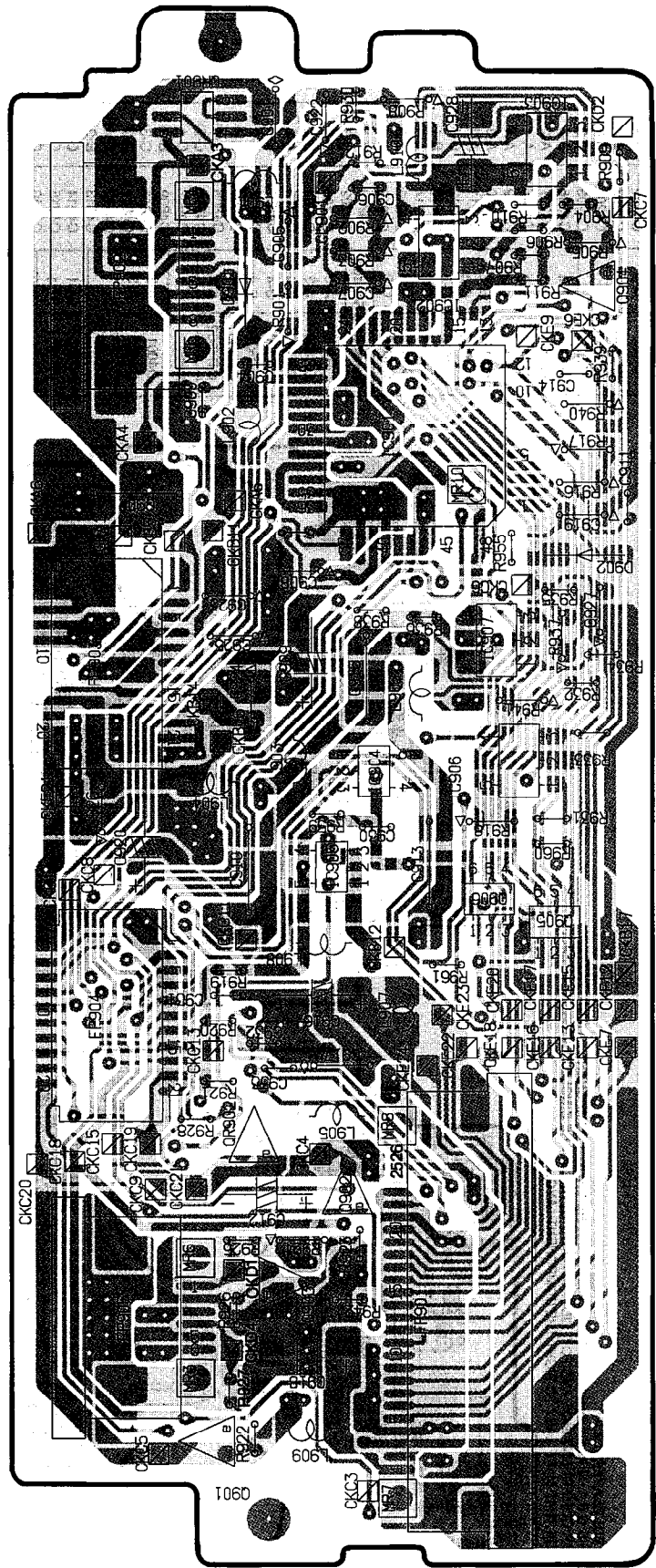
3-16. MIC UNIT C.B.A. (VEP04736A)

MIC UNIT C.B.A.			
Integrated Circuit	Transistor	Resistor	Capacitor
IC4001	Q4001	R4001	C4001
IC4201	Q4201	R4201	C4201
IC4701	Q4701	R4701	C4701
IC4801	Q4801	R4801	C4801
IC4802	Q4802	R4802	C4802
Transistor & Resistor			
Q4001	R4001	C4001	
Q4201	R4201	C4201	
Q4701	R4701	C4701	
Q4801	R4801	C4801	
Q4802	R4802	C4802	
Diode			
D4001	R4001	C4001	
D4002	R4002	C4002	
D4003	R4003	C4003	
D4004	R4004	C4004	
D4005	R4005	C4005	
D4006	R4006	C4006	
D4007	R4007	C4007	
D4008	R4008	C4008	
D4009	R4009	C4009	
D4010	R4010	C4010	
D4011	R4011	C4011	
D4012	R4012	C4012	
D4013	R4013	C4013	
D4014	R4014	C4014	
D4015	R4015	C4015	
D4016	R4016	C4016	
D4017	R4017	C4017	
D4018	R4018	C4018	
D4019	R4019	C4019	
D4020	R4020	C4020	
D4021	R4021	C4021	
D4022	R4022	C4022	
D4023	R4023	C4023	
D4024	R4024	C4024	
D4025	R4025	C4025	
D4026	R4026	C4026	
D4027	R4027	C4027	
D4028	R4028	C4028	
D4029	R4029	C4029	
D4030	R4030	C4030	
D4031	R4031	C4031	
D4032	R4032	C4032	
D4033	R4033	C4033	
D4034	R4034	C4034	
D4035	R4035	C4035	
D4036	R4036	C4036	
D4037	R4037	C4037	
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D4043	R4043	C4043	
D4044	R4044	C4044	
D4045	R4045	C4045	
D4046	R4046	C4046	
D4047	R4047	C4047	
D4048	R4048	C4048	
D4049	R4049	C4049	
D4050	R4050	C4050	
D4051	R4051	C4051	
D4052	R4052	C4052	
D4053	R4053	C4053	
D4054	R4054	C4054	
D4055	R4055	C4055	
D4056	R4056	C4056	
D4057	R4057	C4057	
D4058	R4058	C4058	
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D4061	R4061	C4061	
D4062	R4062	C4062	
D4063	R4063	C4063	
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D4066	R4066	C4066	
D4067	R4067	C4067	
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D4069	R4069	C4069	
D4070	R4070	C4070	
D4071	R4071	C4071	
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D4096	R4096	C4096	
D4097	R4097	C4097	
D4098	R4098	C4098	
D4099	R4099	C4099	
D4100	R4100	C4100	
D4101	R4101	C4101	
D4102	R4102	C4102	
D4103	R4103	C4103	
D4104	R4104	C4104	
D4105	R4105	C4105	
D4106	R4106	C4106	
D4107	R4107	C4107	
D4108	R4108	C4108	
D4109	R4109	C4109	
D4110	R4110	C4110	
D4111	R4111	C4111	
D4112	R4112	C4112	
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D4114	R4114	C4114	
D4115	R4115	C4115	
D4116	R4116	C4116	
D4117	R4117	C4117	
D4118	R4118	C4118	
D4119	R4119	C4119	
D4120	R4120	C4120	
D4121	R4121	C4121	
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D4138	R4138	C4138	
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D4140	R4140	C4140	
D4141	R4141	C4141	
D4142	R4142	C4142	
D4143	R4143	C4143	
D4144	R4144	C4144	
D4145	R4145	C4145	
D4146	R4146	C4146	
D4147	R4147	C4147	
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D4150	R4150	C4150	
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D4152	R4152	C4152	
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D4160	R4160	C4160	
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D4171	R4171	C4171	
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D4218	R4218	C4218	
D4219	R4219	C4219	
D4220	R4220	C4220	
D4221	R4221	C4221	
D4222	R4222	C4222	
D4223	R4223	C4223	
D4224	R4224	C4224	
D4225	R4225	C4225	
D4226	R4226	C4226	
D4227	R4227	C4227	
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D4252	R4252	C4252	
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D4269	R4269	C4269	
D4270	R4270	C4270	
D4271	R4271	C4271	
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D4273	R4273	C4273	
D4274	R4274	C4274	
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D4276	R4276	C4276	
D4277	R4277	C4277	
D4278	R4278	C4278	
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D4283	R4283	C4283	
D4284	R4284	C4284	
D4285	R4285	C4285	
D4286	R4286	C4286	
D4287	R4287	C4287	
D4288	R4288	C4288	
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D4299	R4299	C4299	
D4300	R4300	C4300	
D4301	R4301	C4301	
D4302	R4302	C4302	
D4303	R4303	C4303	
D4304	R4304	C4304	
D4305	R4305	C4305	
D4306	R4306	C4306	
D4307	R4307	C4307	
D4308	R4308	C4308	
D4309	R4309	C4309	
D4310	R4310	C4310	
D4311	R4311	C4311	
D4312	R4312	C4312	
D4313	R4313	C4313	
D4314	R4314	C4314	
D4315	R4315	C4315	
D4316	R4316	C4316	
D4317			

3-17. MONITOR C.B.A. (VEP26204B)

MONITOR C.B.A.			
Integrated Circuit		Transistor & Resistor	
IC901	A-3	QR901	B-4
IC902	A-4	QR902	B-2
IC903	A-4	Connector	A-1 B-4 B-3 B-2 B-1
IC904	A-3		
IC905	A-2		
IC906	A-3		
IC907	A-3		
Transistor		Test Point	
Q901	B-1	CL901	A-4
Q902	A-2		
Q903	B-1		
Q904	A-4		
Q905	A-2		
Q906	A-2		

ADDRESS INFORMATION



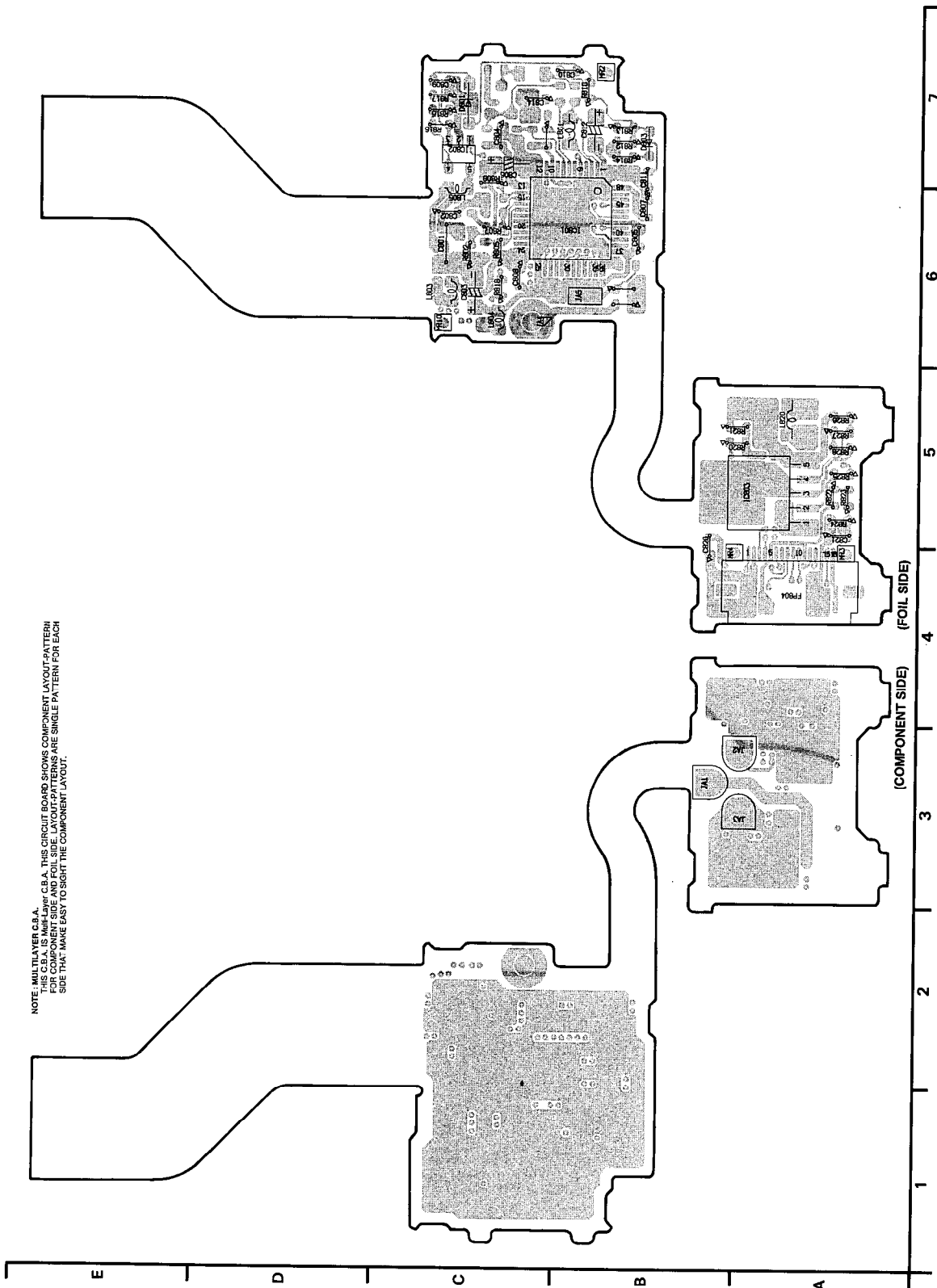
B

A

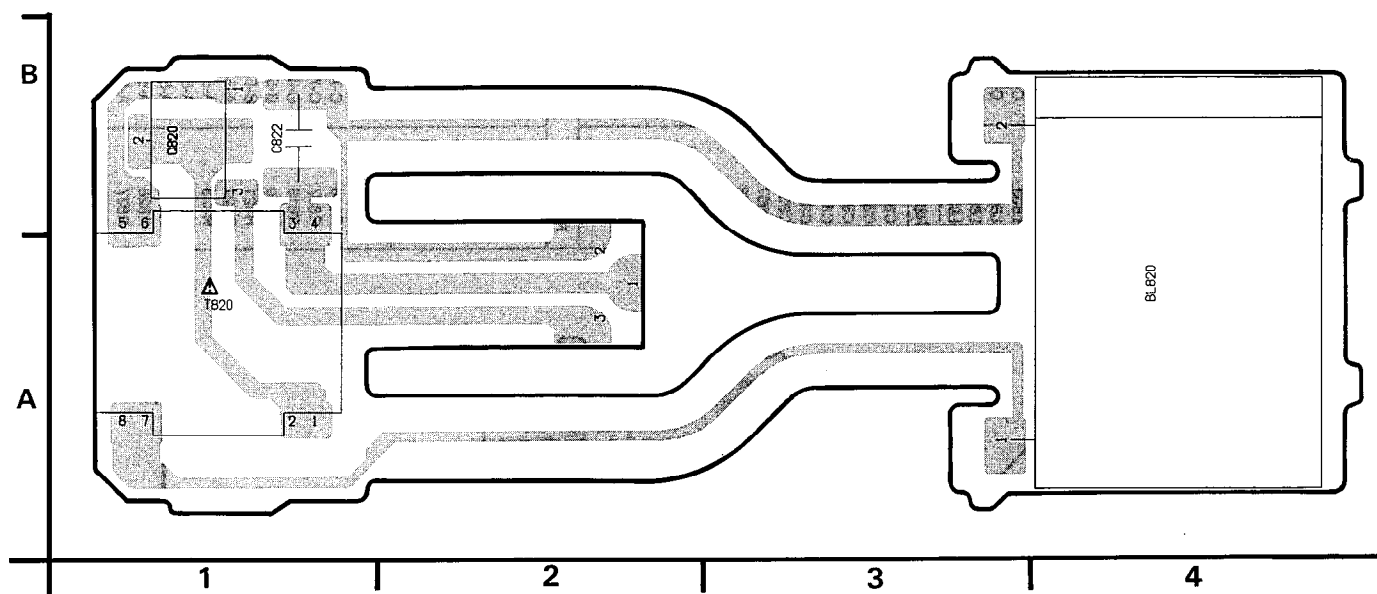
3-18. E.V.F. (A) C.B.A. (VEP28254B)

E.V.F. (A) C.B.A.	
Integrated Circuit	
IC801	B-6
IC802	C-7
IC803	A-5
Diode	
D801	C-7
D803	B-7
Connector	
FP804	A-4
Coil	
L801	B-7
L803	C-6
L804	C-6
L805	C-6
L820	A-5
Capacitor	
C801	C-6
C802	C-6
C803	C-6
C804	C-7
C805	B-6
C806	C-7
C807	B-6
C808	C-6
C809	C-7
C810	B-7
C811	B-7
C812	B-7
C814	C-7
C820	B-5
C821	A-5
Resistor	
R802	C-6
R805	C-6
R807	C-6
R808	C-7
R810	B-7
R812	B-7
R813	B-7
R814	B-7
R815	C-7
R816	C-7
R817	C-7
R818	C-6
R820	B-5
R821	B-5
R822	A-5
R823	A-5
R824	A-5
R825	A-5
R826	A-5
R827	A-5
R828	A-5

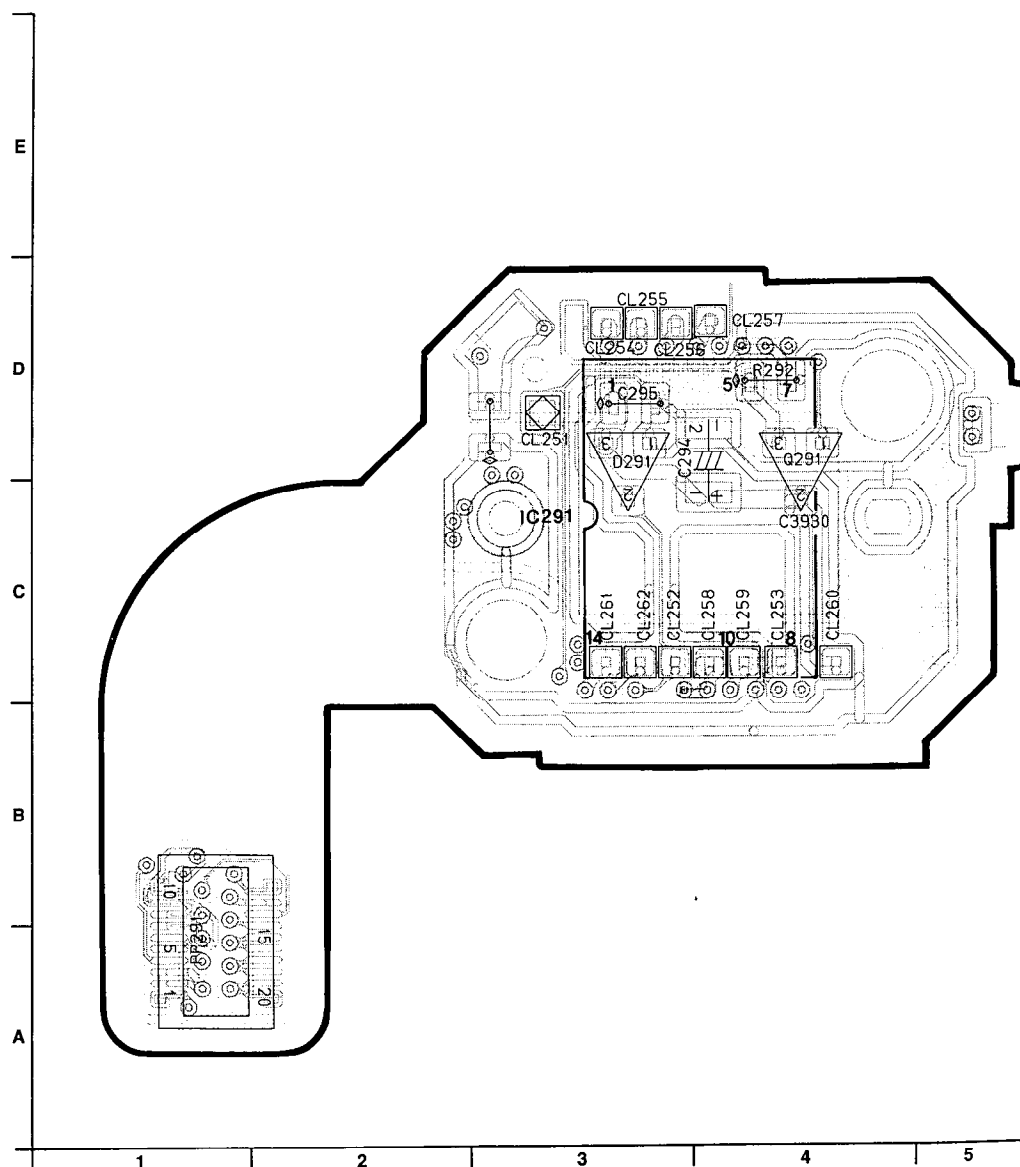
ADDRESS INFORMATION



3-19. E.V.F. (B) C.B.A. (VEP28255A)



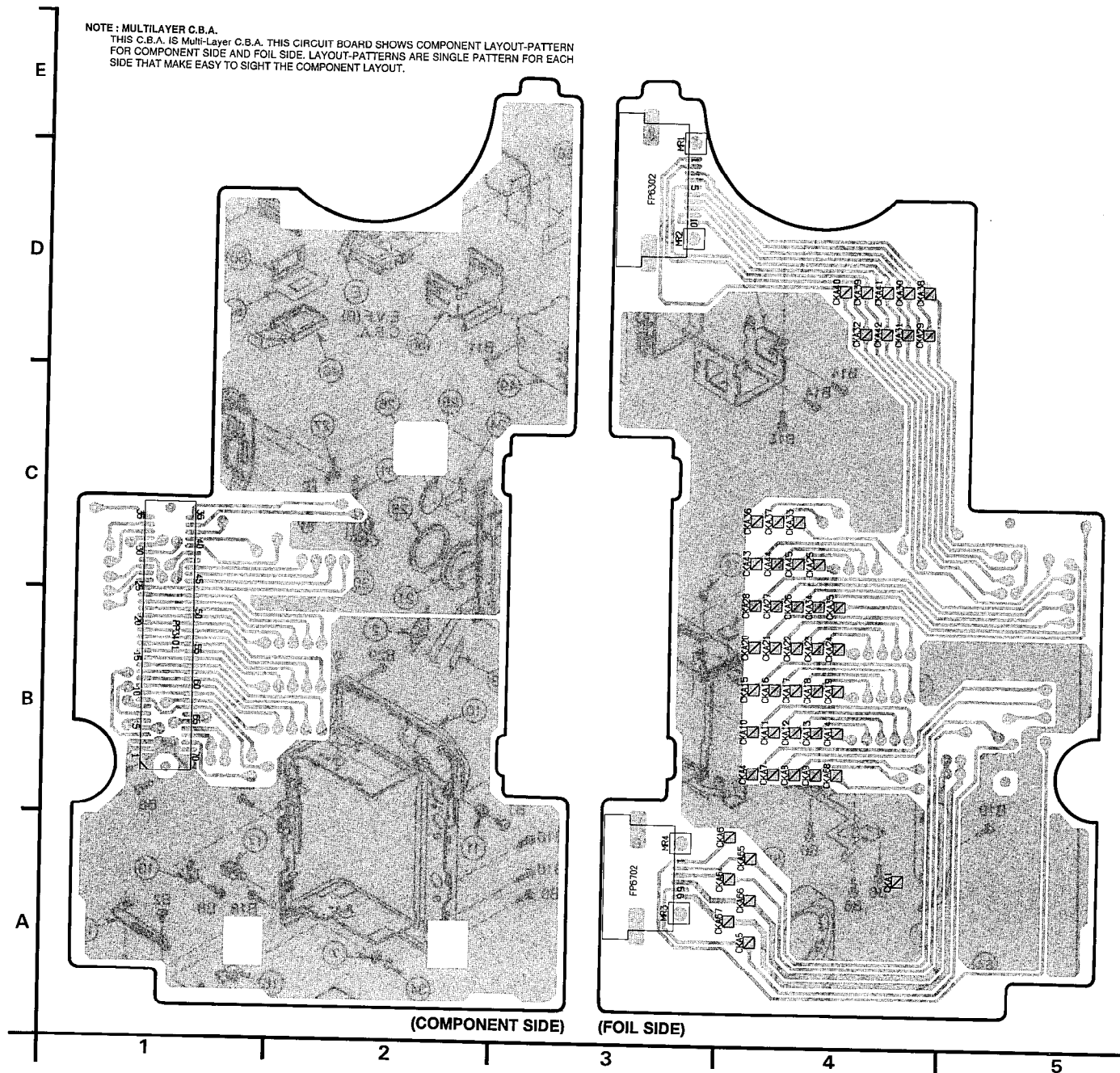
3-20. CCD FLEX. CARD C.B.A. (VEP22279A)



3-21. OPERATION I/F C.B.A. (VEP23479A)

NOTE: MULTILAYER C.B.A.

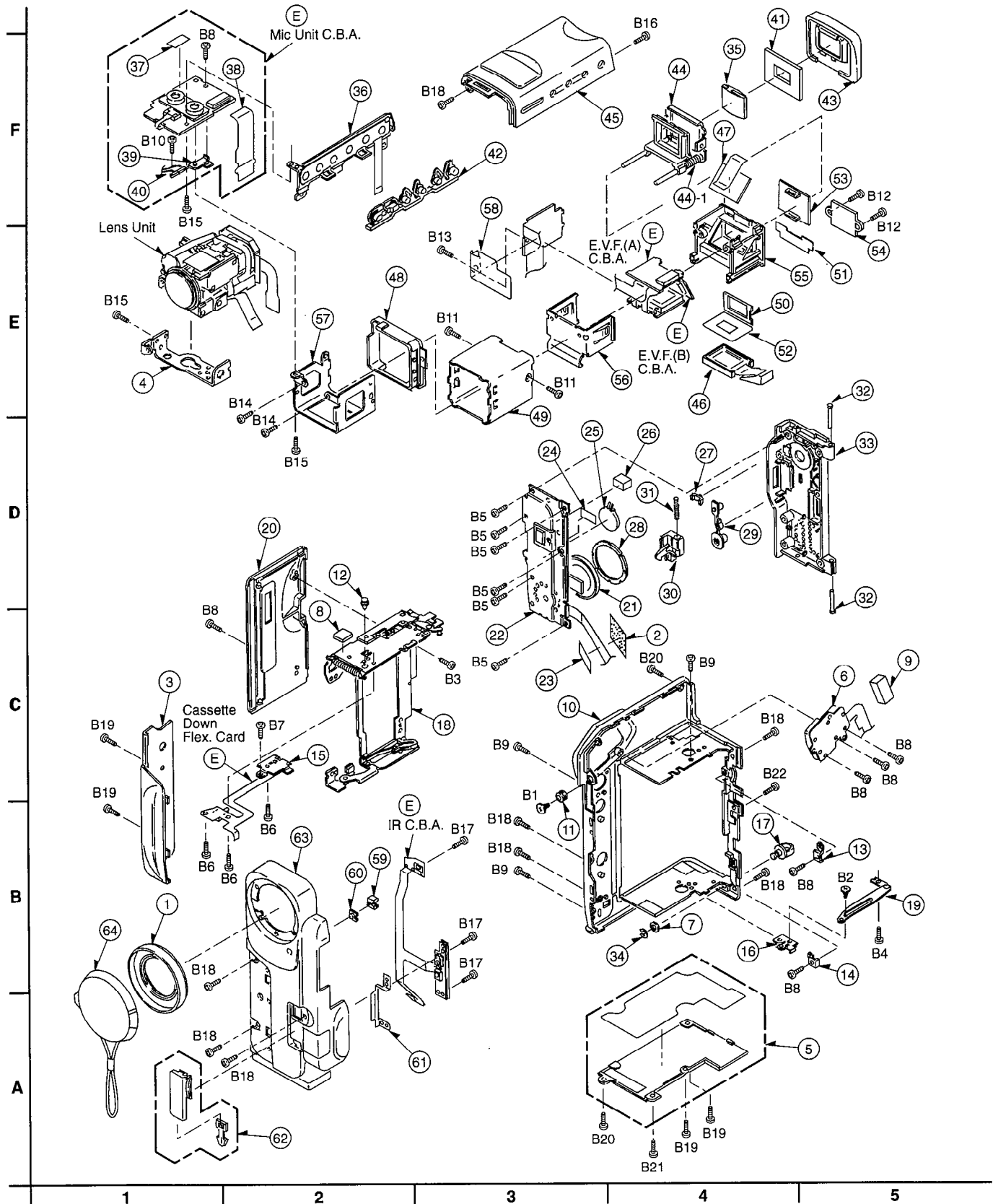
THIS C.B.A. IS Multi-Layer C.B.A. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT-PATTERNS ARE SINGLE PATTERN FOR EACH SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.



SECTION 4 EXPLODED VIEWS & PARTS LIST


4-1. EXPLODED VIEWS & MECHANICAL REPLACEMENT PARTS LIST

① FRAME & CASING PARTS SECTION (1)



Note: 1. *Be sure to make your orders of replacement parts according to this list.

2. IMPORTANT SAFETY NOTICE

Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.

[illegible][illegible]

This exploded view diagram illustrates the assembly of the LCD Unit. The components are organized into five numbered stages (1 to 5) along the bottom, and lettered sections (A to G) along the left side.


- Stage 1:** Shows the initial assembly of the LCD Unit (101) with the LCD Panel (102) and the AV JACK C.B.A. (E) (108). Screws B106 and B107 are used for assembly.
- Stage 2:** Shows the addition of the AV JACK C.B.A. (E) (108) and the AV JACK C.B.A. (E) (109) to the assembly. Screws B107 and B108 are used.
- Stage 3:** Shows the addition of the AV JACK C.B.A. (E) (109) and the AV JACK C.B.A. (E) (110). Screws B107 and B108 are used.
- Stage 4:** Shows the addition of the AV JACK C.B.A. (E) (110) and the AV JACK C.B.A. (E) (111). Screws B107 and B108 are used.
- Stage 5:** Shows the final assembly of the LCD Unit (101) with the LCD Panel (102) and the AV JACK C.B.A. (E) (111). Screws B106 and B107 are used.

Key components and labels include:

- 101:** LCD Unit
- 102:** LCD Panel
- 103:** Drive C.B.A. (E)
- 104:** VTR Main C.B.A. (E)
- 105:** Operation I/F C.B.A. (E)
- 106:** Power C.B.A. (E)
- 107:** AV JACK C.B.A. (E)
- 108:** AV JACK C.B.A. (E)
- 109:** AV JACK C.B.A. (E)
- 110:** AV JACK C.B.A. (E)
- 111:** AV JACK C.B.A. (E)
- 112:** AV JACK C.B.A. (E)
- 113:** AV JACK C.B.A. (E)
- B101:** Screw
- B102:** Screw
- B103:** Screw
- B104:** Screw
- B105:** Screw
- B106:** Screw
- B107:** Screw
- B108:** Screw
- B109:** Screw

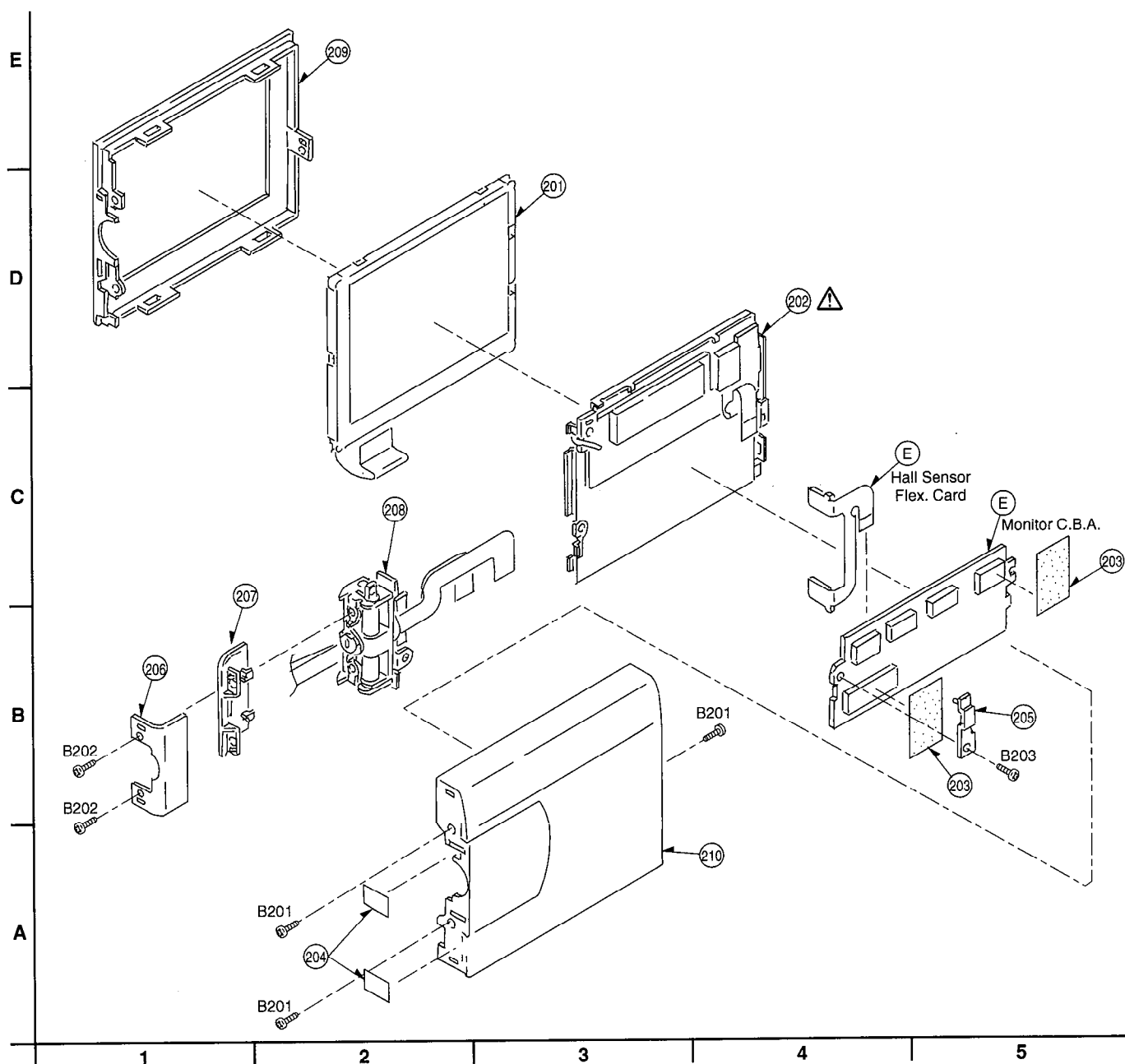
Note: 1. *Be sure to make your orders of replacement parts according to this list.

2. IMPORTANT SAFETY NOTICE

Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.


[illegible][illegible]

③ LCD PARTS SECTION



Note: 1. *Be sure to make your orders of replacement parts according to this list.

2. IMPORTANT SAFETY NOTICE

Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.

[illegible][illegible]

4



D

C

B

A

1

2

3

4

5

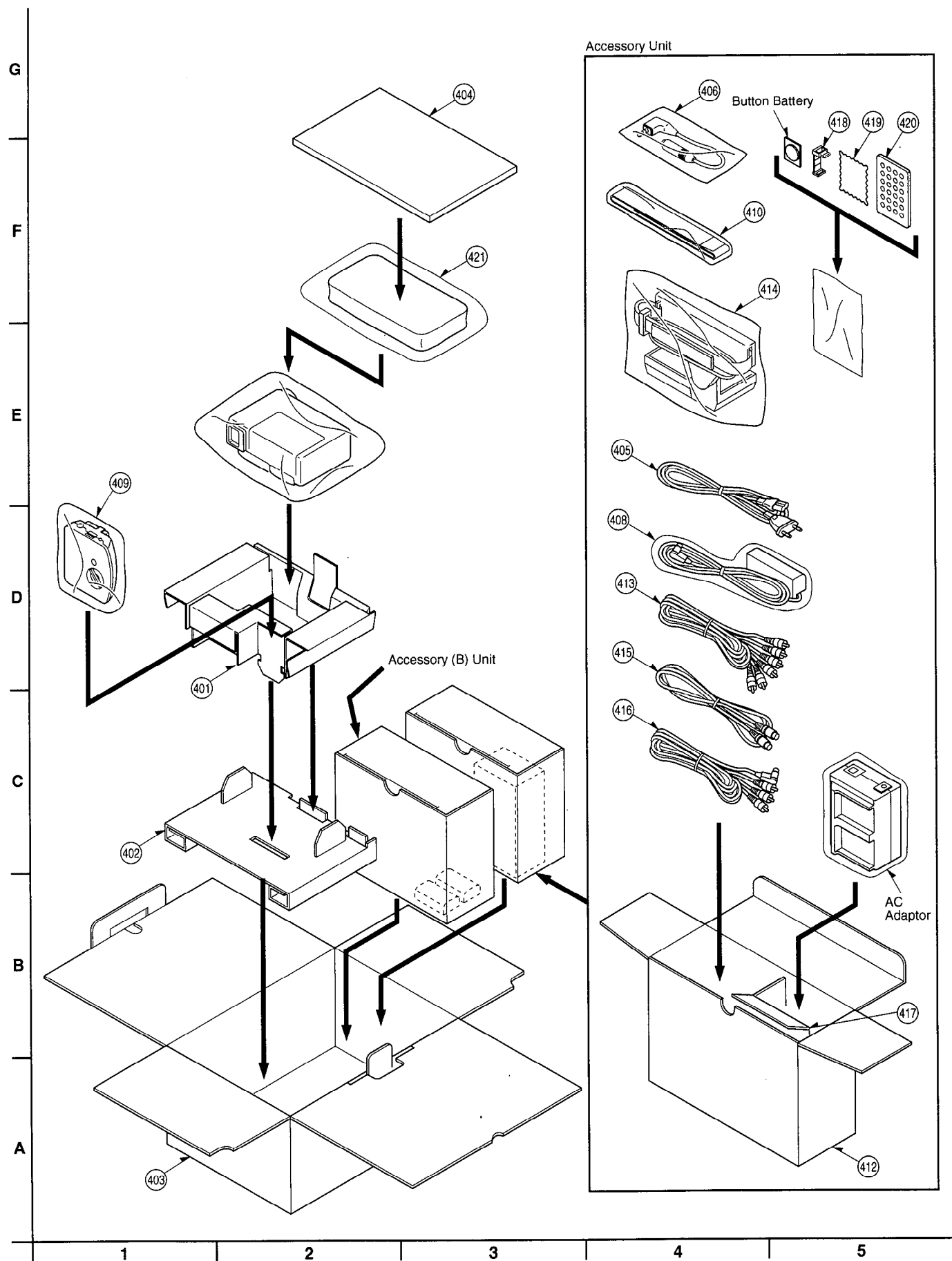
2. IMPORTANT SAFETY NOTICE

Components identified with the mark have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
301	(4) VDL0916	CRYSTAL FILTER	1	
302	(4) VEK8530	CCD ASS'Y	1	
303	(4) VMX2758	CCD CUSHION	1	
304	(4) VXW0403	LENS ASS'Y	1	
304-1	(4) VEK8456	LENS FLEX. CARD C. B. A.	1	
304-2	(4) VEM0653	ZOOM MOTOR ASS'Y	1	
304-3	(4) VMA9961	SIDE YOKE	1	
304-4	(4) VMS6418	GUIDE POLE	1	
304-5	(4) VMS6487	GUIDE POLE (A)	1	
304-6	(4) VXP1886	2ND MOVING FRAME ASS'Y	1	
304-7	(4) VXP1887	4TH MOVING FRAME ASS'Y	1	
304-8	(4) VXQ0730	MAIN FRAME ASS'Y	1	
304-9	(4) VXQ0762	3RD LENS FRAME ASS'Y	1	
304-10	(4) VXL2834	IRIS ASS'Y	1	
304-11	(4) VXQ0752	MASTER FLANGE ASS'Y	1	

[illegible]


5 PACKING PARTS & ACCESSORIES SECTION



This diagram illustrates the assembly of the camera into its main housing. The components and their assembly points are as follows:

- Cassette adaptor**: A rectangular component that fits into the top-left section of the housing.
- 407**: A small electronic component that fits into a slot on the top surface of the housing.
- 423**: A component that fits into a slot on the top surface of the housing, adjacent to 407.
- DV tape**: A tape cartridge that fits into a slot on the top surface of the housing.
- 405**: A cable with a connector that fits into a port on the top surface of the housing.
- 424**: A rectangular component that fits into a slot on the top surface of the housing.
- Battery Pack**: Two battery units that fit into a compartment on the bottom of the housing.
- 412**: The main housing, which is shown in an exploded view with various slots and compartments for the other components.


A

Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.

[illegible]


4-2. ELECTRICAL REPLACEMENT PARTS LIST

Note: 1. Be sure to make your orders of replacement parts according to this list.

2. **IMPORTANT SAFETY NOTICE:** Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.

3. Unless otherwise specified,

 All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICROFARADS (μ F), P= μ UF.

4. The P.C. Board units marked with  show below the main assembled parts.

5. The marking (RTI) indicates the retention time is limited for this item.

After the discontinuation of this assembly in production, it will no longer be available.

[illegible]

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	■ VEP01827B	POWER C. B. A.	1	(RTL)
C1001-04	ECUX1C106VBP	C. CAPACITOR CH 16V 10U	4	
C1005	ECUX1A335KBW	C. CAPACITOR CH 10V 3.3P	1	
C1011	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C1012	ECUX1A335KBW	C. CAPACITOR CH 10V 3.3P	1	
C1013	ECUX1E331KBQ	C. CAPACITOR CH 25V 330P	1	
C1014	ECUX1C223KBQ	C. CAPACITOR CH 16V 0.022U	1	
C1015	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1016	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1018, 19	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	2	
C1021	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C1022	ECUX1A335KBW	C. CAPACITOR CH 10V 3.3P	1	
C1023	ECUX1E331KBQ	C. CAPACITOR CH 25V 330P	1	
C1024	ECUX1C223KBQ	C. CAPACITOR CH 16V 0.022U	1	
C1025	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1026-29	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	4	
C1031	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C1032	ECUX1A335KBW	C. CAPACITOR CH 10V 3.3P	1	
C1033	ECUX1E102KBQ	C. CAPACITOR CH 25V 1000P	1	
C1034	ECUX1C103KBQ	C. CAPACITOR CH 16V 0.01U	1	
C1035	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1036	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1037	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1041	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C1042	ECUX1A335KBW	C. CAPACITOR CH 10V 3.3P	1	
C1044	ECUX1C223KBQ	C. CAPACITOR CH 16V 0.022U	1	
C1045	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1046	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1052	ECUX1E105KBW	C. CAPACITOR CH 25V 1U	1	
C1053	ECUX1E222KBQ	C. CAPACITOR CH 25V 2200P	1	
C1055	ECUX1C225KBW	C. CAPACITOR CH 16V 2.2U	1	
C1056, 57	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	2	
C1063, 64	ECUX1A225KBW	C. CAPACITOR CH 10V 2.2U	2	
C1065, 66	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	2	
C1082	ECUX1E105KBW	C. CAPACITOR CH 25V 1U	1	
C1083	ECUX1E222KBQ	C. CAPACITOR CH 25V 2200P	1	
C1085	ECUX1C106VBP	C. CAPACITOR CH 16V 10U	1	
C1086, 87	ECUX1E105KBW	C. CAPACITOR CH 25V 1U	2	
C1101	ECUX1H101JCQ	C. CAPACITOR CH 50V 100P	1	
C1102	ECUM1C334KBN	C. CAPACITOR CH 16V 0.33U	1	
C1103	ECUX1A473KBQ	C. CAPACITOR CH 10V 0.047U	1	
C1104	ECUX1A104KBQ	C. CAPACITOR CH 10V 0.1U	1	
C1105	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1106	ECUX1A104KBQ	C. CAPACITOR CH 10V 0.1U	1	
C1107	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1108	ECUX1A104KBQ	C. CAPACITOR CH 10V 0.1U	1	
C1111	ECUX1H102KBV	C. CAPACITOR CH 50V 1000P	1	
C1112	ECUX1E471KBQ	C. CAPACITOR CH 25V 470P	1	
C1113	ECUX1H151JCQ	C. CAPACITOR CH 50V 150P	1	
C1114	ECUX1H390JCQ	C. CAPACITOR CH 50V 39P	1	
C1117	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1118	VCS0JN106	E. CAPACITOR 6.3V 10M	1	
C1119	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C1121	ECUX1H472KBV	C. CAPACITOR CH 50V 4700P	1	
C1122	ECUX1C103KBQ	C. CAPACITOR CH 16V 0.01U	1	
C1123	ECUX1H151JCQ	C. CAPACITOR CH 50V 150P	1	
C1124	ECUX1H390JCQ	C. CAPACITOR CH 50V 39P	1	
C1127-29	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	3	
C1131	ECUX1H822KBV	C. CAPACITOR CH 50V 8200P	1	
C1132	ECUX1A473KBQ	C. CAPACITOR CH 10V 0.047U	1	
C1133	ECUX1H151JCQ	C. CAPACITOR CH 50V 150P	1	
C1134	ECUX1H390JCQ	C. CAPACITOR CH 50V 39P	1	
C1141, 42	ECUX1A224KBV	C. CAPACITOR CH 10V 0.22U	2	
C1143	ECUX1H151JCQ	C. CAPACITOR CH 50V 150P	1	
C1144	ECUX1H390JCQ	C. CAPACITOR CH 50V 39P	1	
C1151	ECUX1H471JCV	C. CAPACITOR CH 50V 470P	1	
C1152	ECUX1E222KBQ	C. CAPACITOR CH 25V 2200P	1	
C1153	ECUX1H151JCQ	C. CAPACITOR CH 50V 150P	1	
C1154	ECUX1H820JCQ	C. CAPACITOR CH 50V 82P	1	
C1155	ECUX0J225KBN	C. CAPACITOR CH6.3V 2.2U	1	
C1181	ECUX1H822KBV	C. CAPACITOR CH 50V 8200P	1	
C1182	ECUX1C103KBQ	C. CAPACITOR CH 16V 0.01U	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
QR4001	MRN1103	TRANSISTOR	1	
QR4002	MRN2103	TRANSISTOR	1	
QR4201, 02	MRN1104	TRANSISTOR	2	
QR4203	MRN1103	TRANSISTOR	1	
QR4801, 02	MRN1103	TRANSISTOR	2	
R4001, 02	ERJ2RHD273	M. RESISTOR CH 2W 27K	2	
R4003, 04	ERJ2RHD822	M. RESISTOR CH 2W 8.2K	2	
R4011, 12	ERJ2RHD103	M. RESISTOR CH 2W 10K	2	
R4013, 14	ERJ2RHD223	M. RESISTOR CH 2W 22K	2	
R4015, 16	ERJ2GEJ273	M. RESISTOR CH 2W 27K	2	
R4017, 18	ERJ2GEJ331	M. RESISTOR CH 2W 33K	2	
R4021	ERJ2GEJ124	M. RESISTOR CH 2W 120K	1	
R4022	ERJ2GEJ681	M. RESISTOR CH 2W 68K	1	
R4201, 02	ERJ2GEJ682	M. RESISTOR CH 2W 6.8K	2	
R4203, 04	ERJ2GEJ103	M. RESISTOR CH 2W 10K	2	
R4211	ERJ2GEJ473	M. RESISTOR CH 2W 47K	1	
R4223	ERJ2GEJ473	M. RESISTOR CH 2W 47K	1	
R4702	ERJ2GEJ102	M. RESISTOR CH 2W 1K	1	
R4703	ERJ2GEJ154	M. RESISTOR CH 2W 150K	1	
R4704	ERJ2GEJ392	M. RESISTOR CH 2W 3.9K	1	
R4706, 07	ERJ2GEJ822	M. RESISTOR CH 2W 8.2K	2	
R4708, 09	ERJ2GEJ392	M. RESISTOR CH 2W 3.9K	2	
R4710, 11	ERJ2GEJ102	M. RESISTOR CH 2W 1K	2	
R4801	ERJ6GEYG392	M. RESISTOR CH 1/10W 3.9K	1	
R4803	ERJ6GEYG392	M. RESISTOR CH 1/10W 3.9K	1	
R4805	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R4806	ERJ2GEJ823	M. RESISTOR CH 2W 82K	1	
R4807	ERJ2GEJ223	M. RESISTOR CH 2W 22K	1	
R4808	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4809, 10	ERJ2GEJ103	M. RESISTOR CH 2W 10K	2	
R4811	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R4812	ERJ2GEJ823	M. RESISTOR CH 2W 82K	1	
R4813	ERJ2GEJ223	M. RESISTOR CH 2W 22K	1	
R4814	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4815, 16	ERJ2GEJ103	M. RESISTOR CH 2W 10K	2	
R4817, 18	ERJ2GEJ393	M. RESISTOR CH 2W 39K	2	
R4823	ERJ2GEJ223	M. RESISTOR CH 2W 22K	1	
R4824	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R4831, 32	ERJ2GEJ472	M. RESISTOR CH 2W 4.7K	2	
R4833	ERJ2GEJ153	M. RESISTOR CH 2W 15K	1	
R4834	ERJ2GEJ222	M. RESISTOR CH 2W 2.2K	1	
R4835	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R4836	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4837	ERJ2GEJ332	M. RESISTOR CH 2W 3.3K	1	
R4838	ERJ2GEJ153	M. RESISTOR CH 2W 15K	1	
R4839	ERJ2GEJ222	M. RESISTOR CH 2W 2.2K	1	
R4840	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R4841	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4842	ERJ2GEJ332	M. RESISTOR CH 2W 3.3K	1	
R4843	ERJ2GEJ472	M. RESISTOR CH 2W 4.7K	1	
R4844-49	ERJ2GEJ153	M. RESISTOR CH 2W 15K	6	
R4850	ERJ2GEJ103	M. RESISTOR CH 2W 10K	1	
R4851	ERJ2GEJ332	M. RESISTOR CH 2W 3.3K	1	
R4852	ERJ2GEJ103	M. RESISTOR CH 2W 10K	1	
R4853	ERJ2GEJ332	M. RESISTOR CH 2W 3.3K	1	
R4860	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4863	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R4999	VEK8428	DEW SENSOR ASS'Y	1	
RA4001	EXB24V562J	COMBI. R-R 5.6K	1	
X4701	VXS0982	CRYSTAL OSCILLATOR	1	
		MISCELLANEOUS		
	VMT0902	MIC DUMPER	1	
	VMP5673	DEW HOLER ANGLE	1	
	XQN2+B2	SCREW	1	
	XQN16+B2FZ	SCREW	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	■ VEP28254B	E. V. F. (A) C. B. A.	1	(RTL)
C801	ECUX1A335KB	C. CAPACITOR CH 10V 3.3P	1	
C802	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C803	ECST0JY106Z	T. CAPACITOR CH6.3V 10U	1	
C804, 05	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	2	
C806	ECST0JY106Z	T. CAPACITOR CH6.3V 10U	1	
C807-09	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	3	
C810	ECUX1H102KBV	C. CAPACITOR CH 50V 1000P	1	
C811	ECUX1H472KBV	C. CAPACITOR CH 50V 4700P	1	
C812	ECST1CY225Z	T. CAPACITOR CH 16V 2.2U	1	
C814	ECUX1H470JCV	C. CAPACITOR CH 50V 47P	1	
C820, 21	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	2	
D801	MA338	DIODE	1	
D803	1SS355	DIODE	1	
FP804	VJS4036B016	CONNECTOR (FEMALE)	1	
IC801	ET2070F0C	IC	1	
IC802	TA75S558F	IC	1	
IC803	PQ20V21U	IC	1	
L801	VLQ0426J6R8	COIL 6.8UH	1	
L803-05	VLQ0807K100	COIL 10UH	3	
L820	VLQ0779K100	COIL 10UH	1	
R802	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	1	
R805	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	1	
R807, 08	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	2	
R810	ERJ3GEYJ104	M. RESISTOR CH 1/16W 100K	1	
R812	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	1	
R813	ERJ3GEYG472	M. RESISTOR CH 1/16W 4.7K	1	
R814, 15	ERJ3GEYG471	M. RESISTOR CH 1/16W 47K	2	
R816	ERJ3GEYJ223	M. RESISTOR CH 1/16W 22K	1	
R817	ERJ3GEYJ103	M. RESISTOR CH 1/16W 10K	1	
R818	ERJ3GEYG682	M. RESISTOR CH 1/16W 6.8K	1	
R820	ERJ3GEYJ101	M. RESISTOR CH 1/16W 10K	1	
R821	ERJ3GEYJ473	M. RESISTOR CH 1/16W 47K	1	
R822	ERJ3RBD183	M. RESISTOR CH 3W 18K	1	
R823	ERJ3RBD272	M. RESISTOR CH 3W 2.7K	1	
R824	ERJ3RBD183	M. RESISTOR CH 3W 18K	1	
R825	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	1	
R826	ERJ3RBD102	M. RESISTOR CH 3W 1K	1	
R827	ERJ3RBD112	M. RESISTOR CH 3W 1.1K	1	
R828	ERJ3RBD272	M. RESISTOR CH 3W 2.7K	1	
W802, 03	ERJ3GEY0R00	M. RESISTOR CH 1/16W 0	2	
W805, 06	ERJ3GEY0R00	M. RESISTOR CH 1/16W 0	2	
BL820	VLL0210	LAMP	1	
C822	ECUX1A226WBS	C. CAPACITOR CH 10V 22U	1	
Q820	2SK2055	TRANSISTOR	1	
T820	ETJ11K73AM	TRANSFORMER	1	
	■ VEP28255A	E. V. F. (B) C. B. A.	1	(RTL)

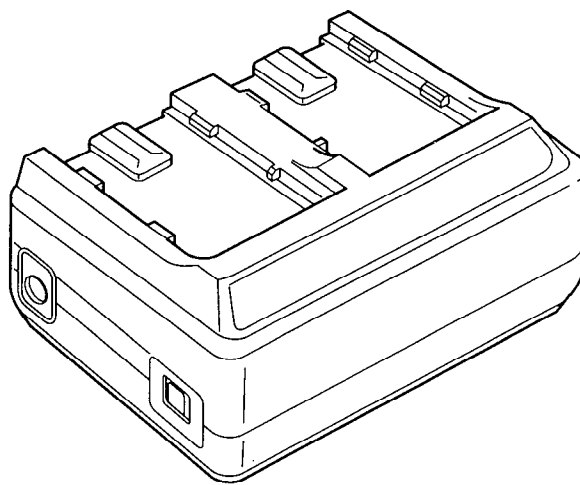
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	■ VEP00258A	AV JACK C.B. A.	1	(RTL)
C4051, 52	ECUM1H472KBN	C. CAPACITOR CH 50V 4700P	2	
FL4051	VLF1445	FILTER	1	
FL4052	VLF1341B107	FILTER	1	
J4051	VJJ0612	AV JACK	1	
		MISCELLANEOUS		
	VQ5120	TAPE	1	
	VMZ2897	BARRIER	1	
	■ VEP06C60A	HALL SENSOR FLEX. CARD C.B. A.	1	(RTL)
IC991, 92	DN8797MSC	IC	2	
	■ VEP26204B	MONITOR C.B. A.	1	(RTL)
C901	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C902	ECUX1C105KBM	C. CAPACITOR CH 16V 1U	1	
C903	ECUX1E471KBQ	C. CAPACITOR CH 25V 470P	1	
C904	ECUX1H150JCQ	C. CAPACITOR CH 50V 15P	1	
C905	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	1	
C906	ECUX1E561KBQ	C. CAPACITOR CH 25V 560P	1	
C907, 08	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	2	
C909	ECST0JY106Z	T. CAPACITOR CH6. 3V 10U	1	
C910	ECUX1C105KBM	C. CAPACITOR CH 16V 1U	1	
C911	ECUX1E222KBQ	C. CAPACITOR CH 25V 2200P	1	
C912	ECST0JY106Z	T. CAPACITOR CH6. 3V 10U	1	
C913	ECUX1C105KBM	C. CAPACITOR CH 16V 1U	1	
C914	ECUX1E102KBQ	C. CAPACITOR CH 25V 1000P	1	
C915	ECUX0J106VBM	C. CAPACITOR CH6. 3V 10U	1	
C916	ECST0JY106Z	T. CAPACITOR CH6. 3V 10U	1	
C917	ECUX1A105KBN	C. CAPACITOR CH 10V 1U	1	
C918	ECST1VX225Z	T. CAPACITOR CH 35V 2.2U	1	
C919	ECUX1A334KBV	C. CAPACITOR CH 10V 0.33U	1	
C920	ECST1AY475	T. CAPACITOR CH 10V 4.7U	1	
C922-27	ECUX1C104KBV	C. CAPACITOR CH 16V 0.1U	6	
C928	ECST0JY106Z	T. CAPACITOR CH6. 3V 10U	1	
C930-33	ECUX1E471KBQ	C. CAPACITOR CH 25V 470P	4	
D901	MA329	DIODE	1	
D902	MA111	DIODE	1	
FP901	VJS4194B026	CONNECTOR (FEMALE)	1	
FP902	VJS3319B008	CONNECTOR (FEMALE)	1	
FP903, 04	VJS3971B021	CONNECTOR (FEMALE)	2	
FP905	VJS3319B006	CONNECTOR (FEMALE)	1	
IC901	CM7018L3	IC	1	
IC902, 03	TA75S558F	IC	2	
IC904	TC7S14F	IC	1	
IC905	TC7S04FU	IC	1	
IC906, 07	TA75S558F	IC	2	
L901	VLQ0807K220	COIL 22UH	1	
L902	VLQ0426J100	COIL 10UH	1	
L903-10	VLQ0807K100	COIL 10UH	8	
Q901-04	ZSD2216	TRANSISTOR	4	
Q905, 06	XP4601	TRANSISTOR-RESISTOR	2	
QR901	XP4314	TRANSISTOR-RESISTOR	1	
QR902	MRN1104	TRANSISTOR	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R901	ERJ3GEYJ103	M. RESISTOR CH 1/16W 10K	1	
R902	ERJ3GEYJ105	M. RESISTOR CH 1/16W 1M	1	
R903	ERJ3GEYJ683	M. RESISTOR CH 1/16W 68K	1	
R904	ERJ2GEJ223	M. RESISTOR CH 2W 22K	1	
R905	ERJ3GEYJ683	M. RESISTOR CH 1/16W 68K	1	
R906	ERJ2GEJ472	M. RESISTOR CH 2W 4.7K	1	
R907	ERJ2GEJ473	M. RESISTOR CH 2W 47K	1	
R908	ERJ3GEYJ124	M. RESISTOR CH 1/16W 120K	1	
R909	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R910	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R911	ERJ2GEJ472	M. RESISTOR CH 2W 4.7K	1	
R912	ERJ2GEJ471	M. RESISTOR CH 2W 470	1	
R916	ERJ3RBD182	M. RESISTOR CH 3W 1.8K	1	
R917	ERJ3GEY0R00	M. RESISTOR CH 1/16W 0	1	
R918	ERJ3GEY682	M. RESISTOR CH 1/16W 6.8K	1	
R919-21	ERJ2GEJ101	M. RESISTOR CH 2W 100	3	
R922, 23	ERJ2GEJ563	M. RESISTOR CH 2W 56K	2	
R924	ERJ3GEYJ333	M. RESISTOR CH 1/16W 33K	1	
R925	ERJ2GE0R00	M. RESISTOR CH 2W 0	1	
R926	ERJ2GEJ563	M. RESISTOR CH 2W 56K	1	
R927	ERJ2GE0R00	M. RESISTOR CH 2W 0	1	
R928	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R930	ERJ2GEJ333	M. RESISTOR CH 2W 33K	1	
R931	ERJ2GEJ682	M. RESISTOR CH 2W 6.8K	1	
R932	ERJ2GEJ223	M. RESISTOR CH 2W 22K	1	
R933	ERJ2GEJ103	M. RESISTOR CH 2W 10K	1	
R934	ERJ2GEJ473	M. RESISTOR CH 2W 47K	1	
R935	ERJ2GEJ103	M. RESISTOR CH 2W 10K	1	
R936	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R937	ERJ3GEYJ103	M. RESISTOR CH 1/16W 10K	1	
R938	ERJ2GEJ682	M. RESISTOR CH 2W 6.8K	1	
R939	ERJ2GEJ103	M. RESISTOR CH 2W 10K	1	
R940	ERJ3GEYJ103	M. RESISTOR CH 1/16W 10K	1	
R941	ERJ3GEYJ220	M. RESISTOR CH 1/16W 22	1	
R942	ERJ2GEJ104	M. RESISTOR CH 2W 100K	1	
R955	ERJ2GEJ563	M. RESISTOR CH 2W 56K	1	
R959	ERJ2RHD104	M. RESISTOR CH 2W 100K	1	
R960, 61	ERJ2GEJ223	M. RESISTOR CH 2W 22K	2	
W902	ERJ2GE0R00	M. RESISTOR CH 2W 0	1	
	■ VEP00259A	IR C.B. A.	1	(RTL)
C6401	ECUX1E104KBN	C. CAPACITOR CH 25V 0.1U	1	
C6402	ECST0JY106Z	T. CAPACITOR CH6. 3V 10U	1	
D6801	CL150HR-CD	DIODE	1	
D6802	PH310	DIODE	1	
IR6401	VEK8283	REMOTE CONTROL RECEIVER	1	
	■ VEP22279A	CCD FLEX. CARD C.B. A.	1	(RTL)
C294	ECST1VX225Z	T. CAPACITOR CH 35V 2.2U	1	
C295	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
D291	VJP4009C020	CONNECTOR (MALE) 20P	1	
Q291	2SC3930	TRANSISTOR	1	
R292	ERJ6GEYF472	M. RESISTOR CH 1/10W 4.7K	1	
		MISCELLANEOUS		
	VJB22279	FLEX. CARD	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	■ VEK8456	LENS FLEX. CARD C. B. A.	1	(RTL)
		MISCELLANEOUS		
	CNA1312K01VT	PHOTO SENSOR	1	
	VEK8449	MR SENSOR ASS'Y	1	
	VJB20763	FLEX. CARD	1	

SECTION 5

VW – AD7E



SPECIFICATIONS

ITEM	SPECIFICATION
POWER	Source: AC 100 ~ 240 V, 50/60 Hz (Automatic Voltage Adjustment)
	Consumption: Approx. 20 W
	Output: DC 7.9 V, 9 W (Movie Camera Operation) DC 8.4 V, 1.2 A (Battery Pack Charging)
	Input: DC 12 V (Car Battery)
DIMENSIONS	102 (W) × 50 (H) × 79 (D) mm
WEIGHT	Approx. 230 g (Without AC Cable)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

CAUTION: FOR USE WITH DIGITAL VIDEO CAMERA, MODEL NV-DS77, NV-DA1, NV-EX1 Series.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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INTRODUCTION

Caution for AC CORD (VJA0940 type)

Information for Your Safety

IMPORTANT

Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY

■DO NOT REMOVE THE OUTER COVER.

To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.



Caution for AC Mains Lead

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt, please consult a qualified electrician.

■IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:


Blue: Neutral

Brown: Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

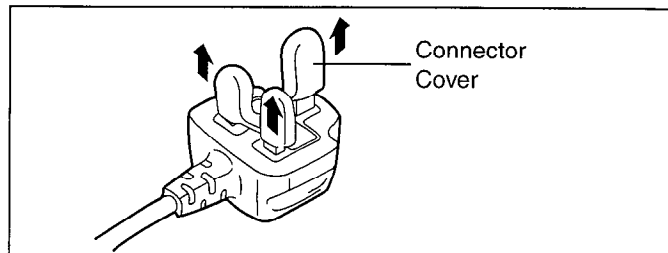
the wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol .

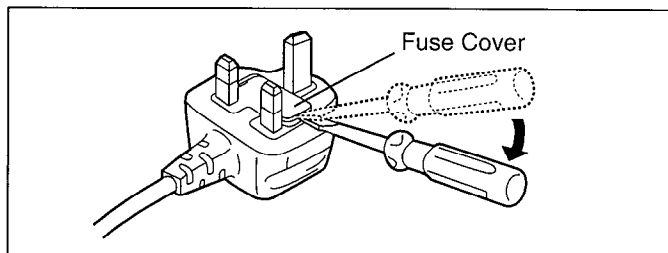
■Before use

remove the Connector Cover as follows.

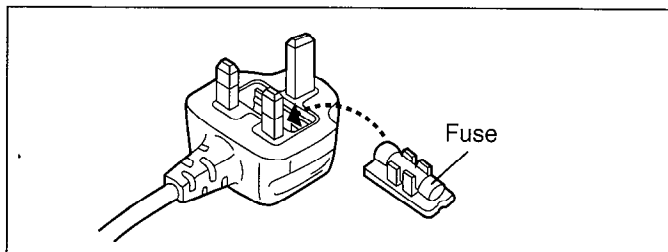


■How to replace the Fuse

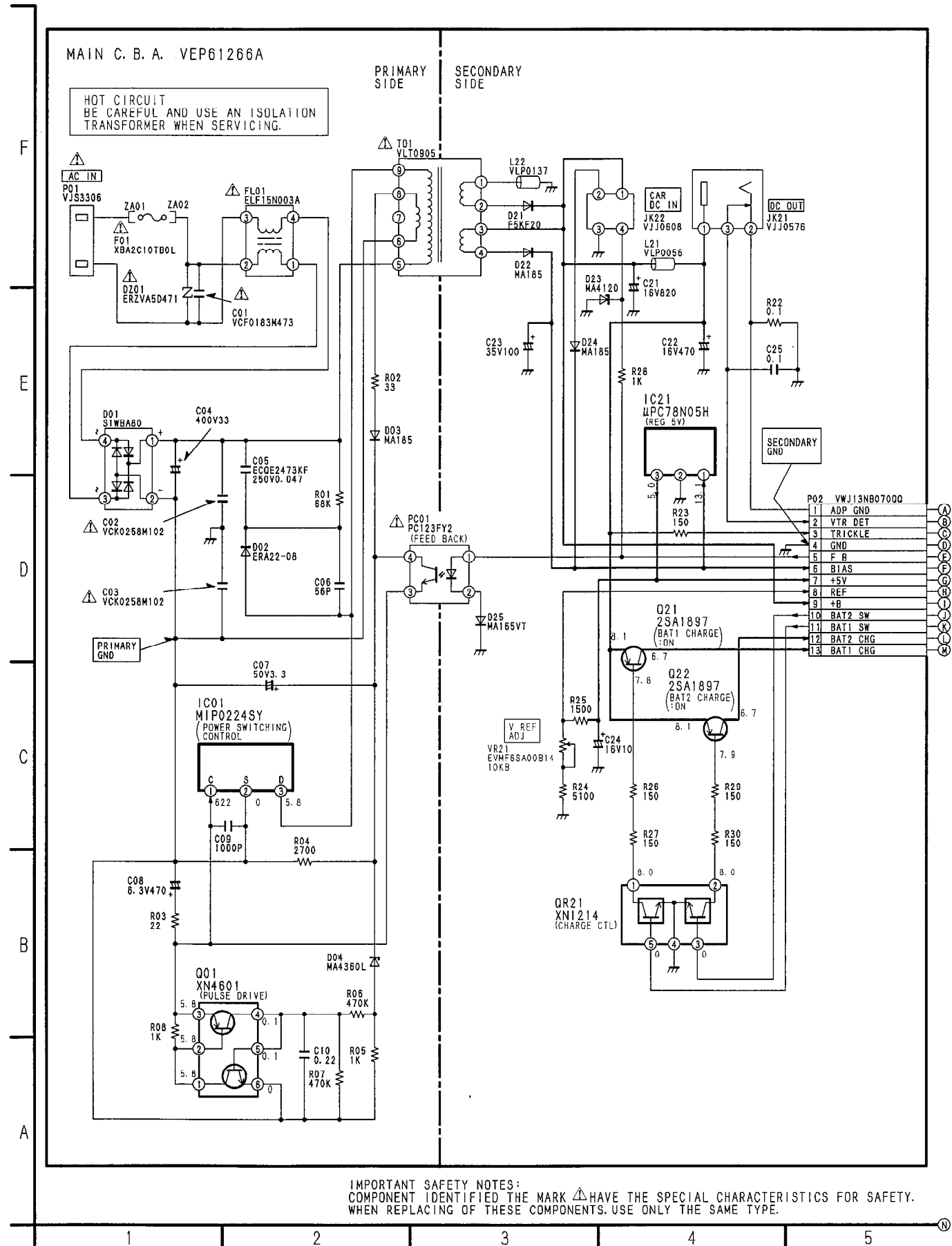
1. Remove the Fuse Cover with a screwdriver.



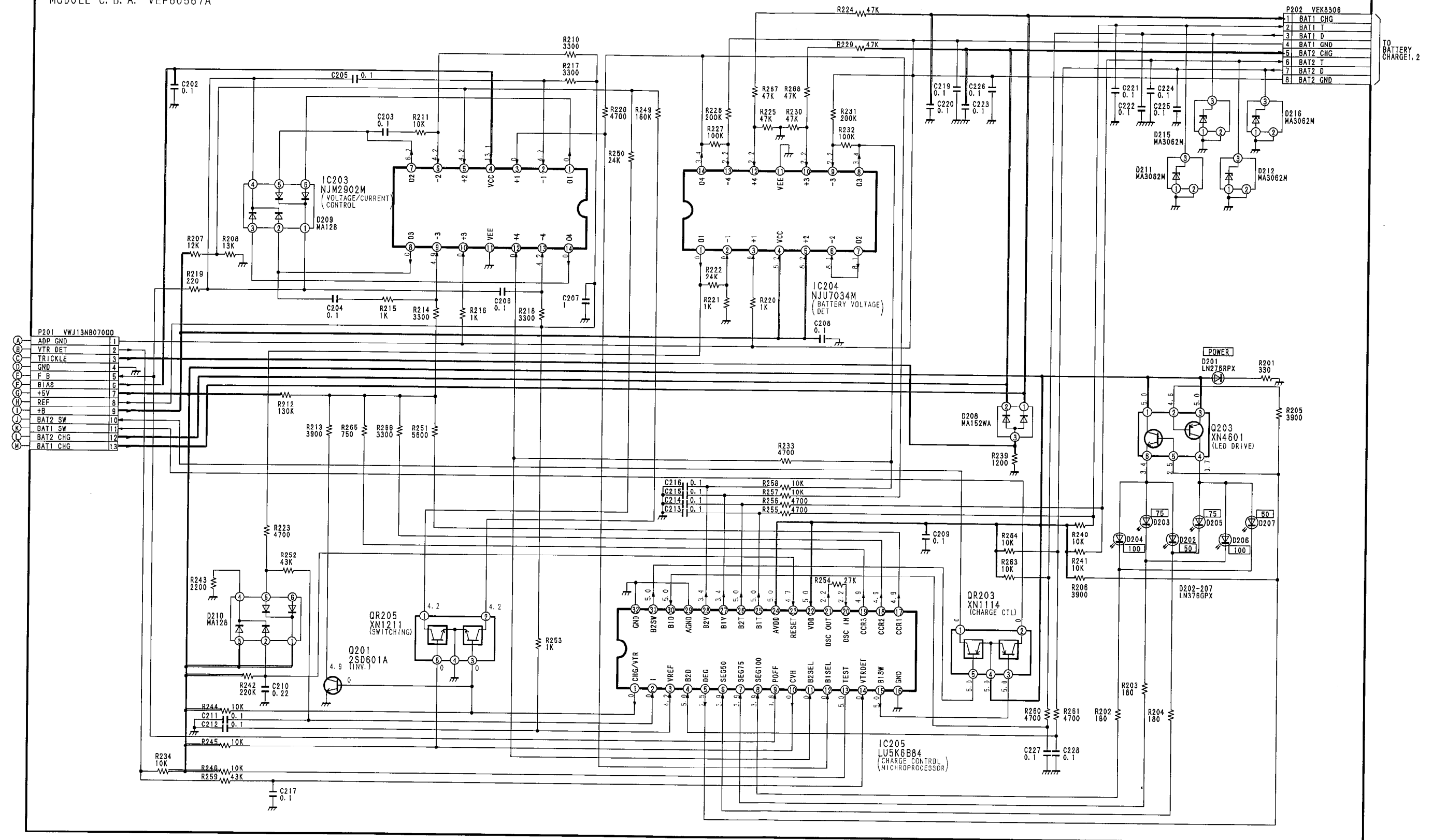
2. Replace the fuse and attach the Fuse cover.



1. AC ADAPTOR SCHEMATIC DIAGRAM



MODULE C. B. A. VEP60567A



NOTE1: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

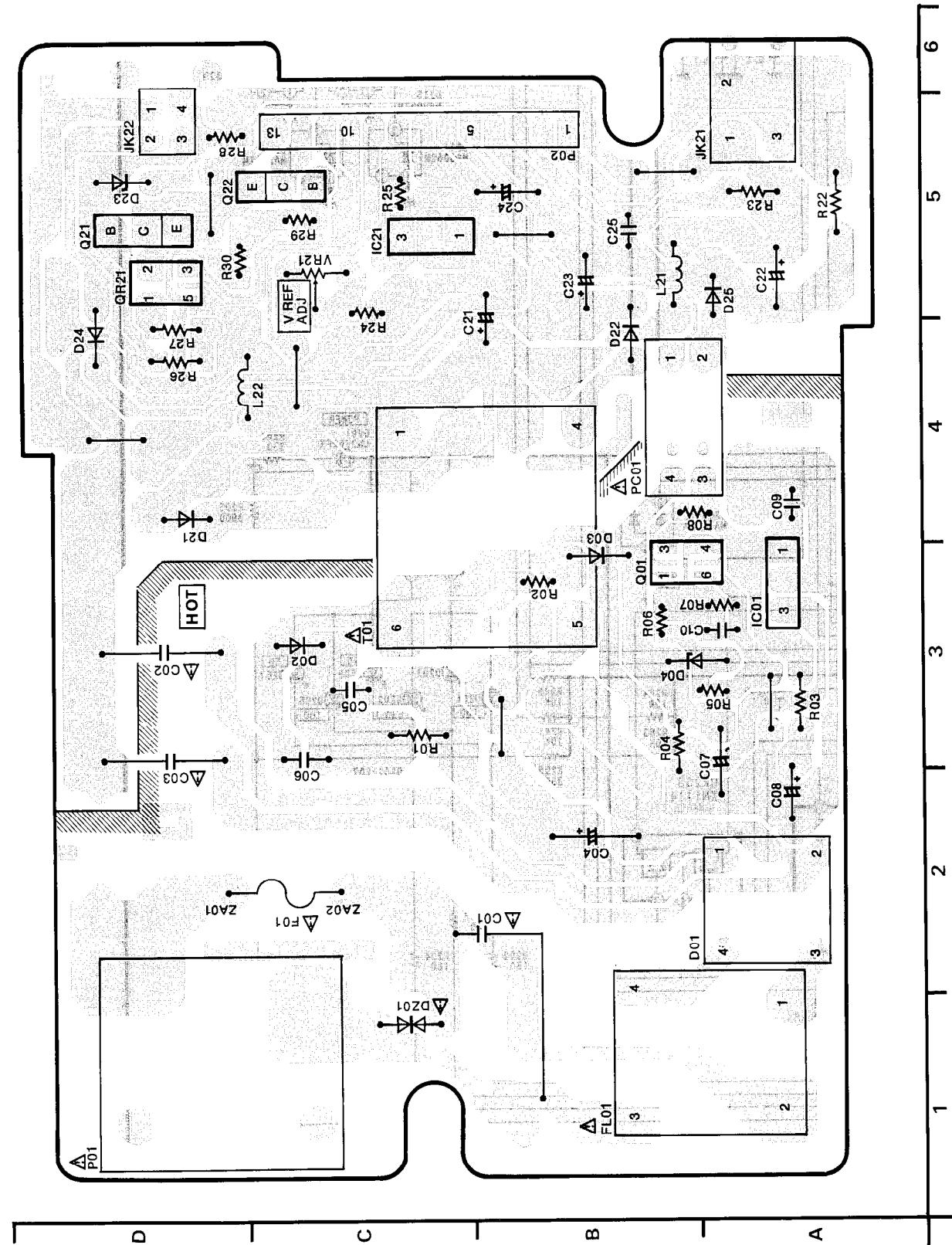
NOTE2: WHEN MEASURE THE DC VOLTAGE AND WAVEFORM, CONNECT THE GND READ OR GND PROBE TO NEXT GND.
PRIMARY SIDE..... IC01-2 PIN OF THE MAIN C. B. A. (PRIMARY GND).
SECONDARY SIDE.... P02-4 PIN OF THE MAIN C. B. A. (SECONDARY GND).

NOTE3: THE DC VOLTAGE INDICATED IN PRIMARY SIDE IS MEASURE WHEN INPUT AC 220V IS APPLIED.

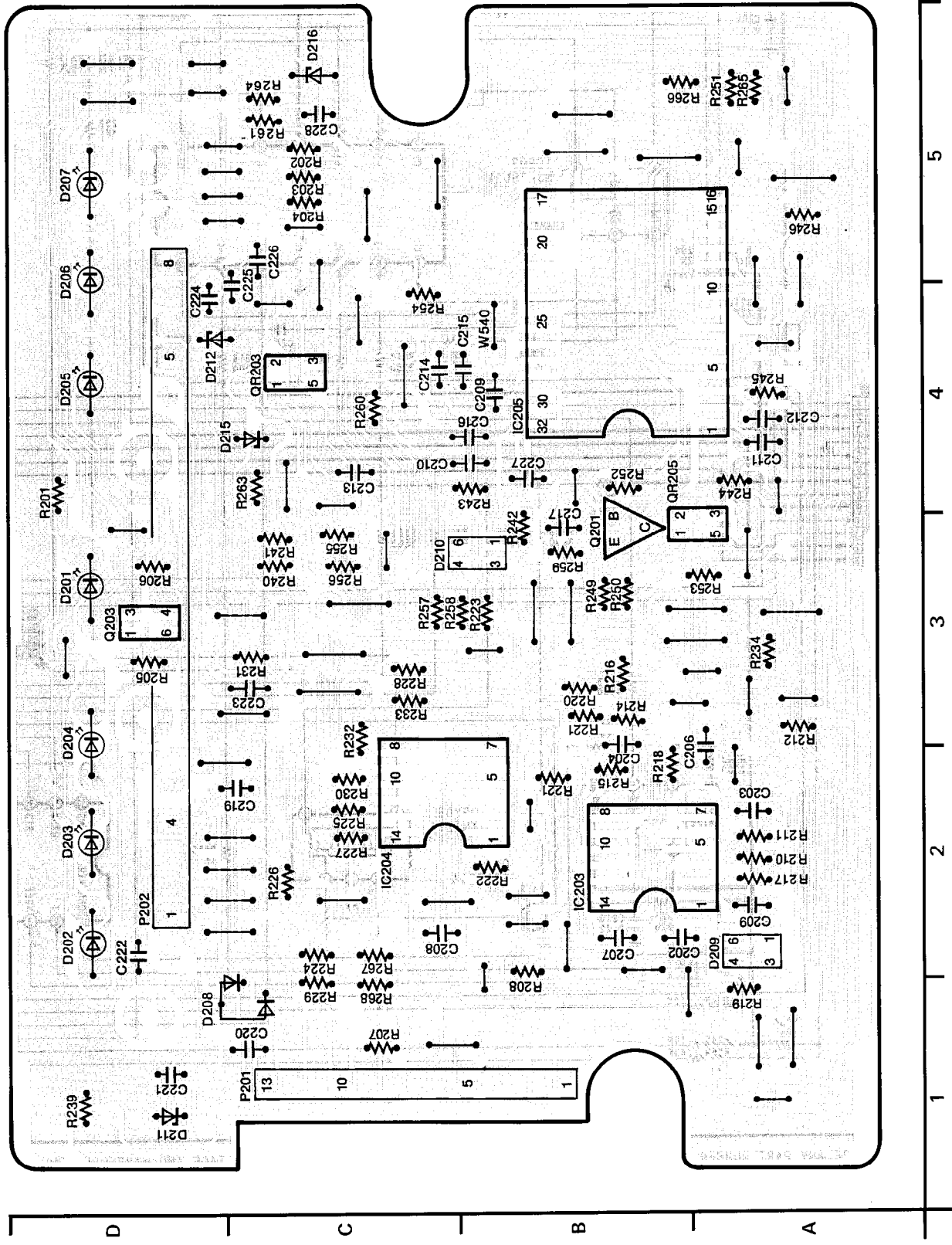
2. AC ADAPTOR CIRCUIT BOARD DIAGRAM

IMPORTANT SAFETY NOTES:
COMPONENT IDENTIFIED THE MARK Δ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING OF THESE COMPONENTS, USE ONLY THE SAME TYPE.
HOT CIRCUIT BE CAREFUL AND USE AN ISOLATION TRANSFORMER WHEN SERVICING.

MAIN C.B.A. (VEP61266A)



MODULE C.B.A. (VEP60567A)



❶ AC ADAPTOR SECTION




Components identified with the mark have the special characteristics for safety. When replacing any of these components, use only the same type.

[illegible]

This diagram illustrates the exploded view of a product box assembly. The components are labeled as follows:

- 101**: The main base of the box, shown in an exploded position relative to the other parts.
- 102**: A side panel or divider that fits into the base.
- 103**: A small pouch or bag, likely for accessories, shown above the side panel.
- 104**: A coiled cable with a connector, shown to the left of the side panel.
- 105**: A coiled cable with a different connector, shown below cable 104.

Arrows indicate the assembly sequence and alignment of the components. The text "AC Adaptor" is visible on the side panel (102).

Components identified with the mark  have the special characteristics for safety. When replacing any of these components, use only the same type.

[illegible]

4. ELECTRICAL REPLACEMENT PARTS LIST

Note: 1. Be sure to make your orders of replacement parts according to this list.
 2. IMPORTANT SAFETY NOTICE: Components identified with the mark Δ have the special characteristics for safety. When replacing any of these components, use only the same type.
 3. Unless otherwise specified,
 All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICROFARADS (μ F), P=uuF.
 4. The P.C. Board units marked with \blacksquare show below the main assembled parts.
 5. The marking (RTL) indicates the retention time is limited for this item.
 After the discontinuation of this assembly in production, it will no longer be available.

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
Δ	\blacksquare VEP61266A	MAIN C. B. A.	1	(RTL)
	\blacksquare VEP60567A	MODULE C. B. A.	1	(RTL)
Δ F01	XBA2C10TB0L	FUSE	1	
Δ	\blacksquare VEP61266A	MAIN C. B. A.		(RTL)
Δ C01	VCF0183M473	POLYESTER FILM CAPACITOR	1	
Δ C02, 03	VCK0258M102	CERAMIC CAPACITOR	2	
C04	VCEA26AT330	E. CAPACITOR 400V 33U	1	
C05	ECQE2473KF	P. CAPACITOR 250V 0.047U	1	
C06	ECGZ3A560K6E	C. CAPACITOR 1KV 56P	1	
C07	EGAIHH63R3	E. CAPACITOR 50V 3.3U	1	
C08	EGAOJHG471	E. CAPACITOR 6.3V 470U	1	
C09	ECUM1H102KBN	C. CAPACITOR CH 50V 1000P	1	
C10	ECUM1C224KBN	C. CAPACITOR CH 16V 0.22U	1	
C21	EEUFA1C821	E. CAPACITOR 16V 820U	1	
C22	EGAIHGH471	E. CAPACITOR 16V 470U	1	
C23	EGAIHVG101	E. CAPACITOR 35V 100U	1	
C24	EGEA1CKG100	E. CAPACITOR 16V 10U	1	
C25	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
D01	S1WBA80	DIODE	1	
D02	ERA22-08	DIODE	1	
D03	MA185	DIODE	1	
D04	MA4360L	DIODE	1	
D21	F5KF20	DIODE	1	
D22	MA185	DIODE	1	
D23	MA4120	DIODE	1	
D24	MA185	DIODE	1	
D25	MA165VT	DIODE	1	
Δ D201	ERZVA50471	TRANSIENT/SURGE ABSORBER	1	
Δ FL01	ELF15N003A	LINE FILTER	1	
IC01	MIP0224SY	IC	1	
IC21	UPC78N05H	IC	1	
JK21	VJJ0576	DC JACK	1	
JK22	VJJ0608	DC JACK (4P)	1	
L21	VLP0056	COIL	1	
L22	VLP0137	COIL	1	
Δ P01	VJS3306	AC INLET	1	
P02	VWJ13NR0700Q	FLAT CARD CABLE	1	
Δ PC01	PG123FY2	PHOTO COUPLER	1	
Q01	XN4601	TRANSISTOR-TRANSISTOR	1	
Q21, 22	2SA1897	TRANSISTOR	2	
QR21	XN1214	TRANSISTOR-RESISTOR	1	
R01	ERG2SJ683	M. RESISTOR 2W 68K	1	
R02	ERJ8GEYJ330	M. RESISTOR CH 1/8W 33	1	
R03	ERDS2TJ220	C. RESISTOR 1/4W 22	1	
R04	ERDS2TJ272	C. RESISTOR 1/4W 2.7K	1	
R05	ERJ6GEYG102	M. RESISTOR CH 1/10W 1K	1	
R06, 07	ERJ6GEYG474	M. RESISTOR CH 1/10W 470K	2	
R08	ERJ6GEYG102	M. RESISTOR CH 1/10W 1K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R22	ERX1SZGR10	M. RESISTOR 1W 0.1	1	
R23	ERG2SJ151	M. RESISTOR 2W 150	1	
R24	ERJ6GEYG512	M. RESISTOR CH 1/10W 5.1K	1	
R25	FRJ6GEYG152	M. RESISTOR CH 1/10W 1.5K	1	
R26, 27	ERJ8GEYJ151	M. RESISTOR CH 1/8W 150	2	
R28	ERJ6GEYG102	M. RESISTOR CH 1/10W 1K	1	
R29, 30	ERJ8GEYJ151	M. RESISTOR CH 1/8W 150	2	
Δ T01	VLT0905	TRANSFORMER	1	
VR21	EVMF6SA00B14	V. RESISTOR 10K	1	
		MISCELLANEOUS		
	VSC4733	HEAT SINK	1	
	XTB26+6G	SCREW	2	
	VSC4744	SHIELD COVER	1	
	\blacksquare VEP60567A	MODULE C. B. A.		(RTL)
Q202	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C203-06	ECUM1E104KBN	C. CAPACITOR CH 25V 0.1U	4	
C207	ECUM1C105ZFN	C. CAPACITOR CH 16V 1U	1	
C208, 09	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	2	
C210	ECUM1C224KBN	C. CAPACITOR CH 16V 0.22U	1	
C211-16	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	6	
C217	ECUX1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C219	ECUX1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C220	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C221	ECUX1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C222	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C223-25	ECUX1E104ZFN	C. CAPACITOR CH 25V 0.1U	3	
C226	ECUM1E104ZFN	C. CAPACITOR CH 25V 0.1U	1	
C227, 28	ECUX1E104ZFN	C. CAPACITOR CH 25V 0.1U	2	
D201	LN276RPX	DIODE	1	
D202-07	LN376GPX	DIODE	6	
D208	MA152WA	DIODE	1	
D209, 10	MA128	DIODE	2	
D211, 12	MA3062M	DIODE	2	
D215, 16	MA3062M	DIODE	2	
IC203	NJM2902M	IC	1	
IC204	NJU7034M	IC	1	
IC205	LU5K6B84	IC	1	
P202	VEK8306	BATTERY CATCHER	1	
Q201	2SD601A	TRANSISTOR	1	
Q203	XN4601	TRANSISTOR-TRANSISTOR	1	
QR203	XN1114	TRANSISTOR-RESISTOR	1	
QR205	XN1211	TRANSISTOR-RESISTOR	1	
R201	ERJ6GEYG331	M. RESISTOR CH 1/10W 330	1	
R202-04	ERJ6GEYG181	M. RESISTOR CH 1/10W 180	3	
R205, 06	ERJ6GEYG392	M. RESISTOR CH 1/10W 3.9K	2	
R207	ERJ3RBD123	M. RESISTOR CH 1/16W 12K	1	
R208	ERJ3RBD133	M. RESISTOR CH 1/16W 13K	1	
R210	ERJ3GEYG332	M. RESISTOR CH 1/16W 3.3K	1	
R211	ERJ3GEYJ103	M. RESISTOR CH 1/16W 10K	1	
R212	ERJ6RED134	M. RESISTOR CH 1/10W 130K	1	
R213	ERJ3RBD392	M. RESISTOR CH 1/16W 3.9K	1	
R214	ERJ3GEYG332	M. RESISTOR CH 1/16W 3.3K	1	
R215	ERJ3GEYG102	M. RESISTOR CH 1/16W 1K	1	
R216	ERJ6GEYG102	M. RESISTOR CH 1/10W 1K	1	
R217, 18	ERJ3GEYG332	M. RESISTOR CH 1/16W 3.3K	2	
R219	ERJ3GEYJ221	M. RESISTOR CH 1/16W 220	1	
R220	ERJ6GEYG102	M. RESISTOR CH 1/10W 1K	1	
R221	ERJ6RBD102	M. RESISTOR CH 1/10W 1K	1	
R222	ERJ3RBD243	M. RESISTOR CH 1/16W 24K	1	
R223	ERJ3GEYG472	M. RESISTOR CH 1/16W 4.7K	1	
R224, 25	ERJ6RBB473	M. RESISTOR CH 1/10W 47K	2	
R226	ERJ6RED204	M. RESISTOR CH 1/10W 200K	1	
R227	ERJ3RBD104	M. RESISTOR CH 1/16W 100K	1	

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